

NetworkWorld

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Breaking through VoIP security

In the first-ever public test of VoIP security, Cisco and Avaya set up secure VoIP networks in Network World Lab Alliance partner Miercom's facility in New Jersey. Then we set loose our four-person attack team. The results: Cisco's network was impenetrable; it survived dozens of attacks during a three-day bombardment. Of course, the setup also required six Cisco security gurus. Avaya's no-frills, out-of-the-box setup had some holes, but its more hardened security configuration performed much better.

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Back for seconds

A year after hosting WLAN switch start-up execs for dinner, we reconvene to learn about what's changed in the market. **Page 12.**

Aruba
Wireless
Networks
CEO Don
LeBeau

S00

Cisco aims to own used-gear market

■ BY PHIL HOCHMUTH

Cisco is quietly rallying its sales force to push its refurbished equipment — at 25% to 30% savings over new products — in order to keep customers from defecting to gray-market vendors of Cisco or rival products.

Cisco says its re-marketed gear not only costs less but is easier to license and support because the company does not honor warranties, IOS software licenses or support contracts for gear pur-

chased from second-hand dealers or at auctions.

But while Cisco is peddling its own used gear more aggressively, many users still prefer the 50% to 75% markdowns offered by second-hand dealers outside of Cisco's authorized channels. At those prices, some say, it's worth jumping over the hurdles Cisco

puts up for used-gear licensing and support.

Cisco last month touted its Authorized Remarketing Program as a way for its resellers to counter gray-marketers and other vendors offering low-ball deals. Although Cisco started its refurbishment program in 2000, it was

See Cisco, page 18

A Wider Net

Pneumatic nets haven't gone down the tubes

Why is that? Try delivering bottles of pills over Ethernet, explains one hospital exec.

■ BY STEPHEN LAWSON

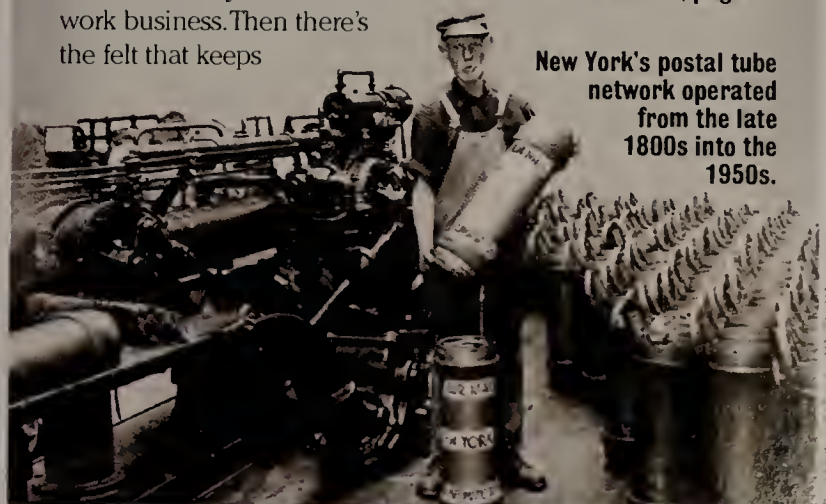
User authentication, security and traffic prioritization are hot topics for Ken Moeller, as they are for so many in the network business. Then there's the felt that keeps

wearing out.

The felt is on the outside of cylindrical carriers — usually plastic and 6 inches in diameter — that zip through networks of tubes in and even

See Pneumatic, page 20

New York's postal tube network operated from the late 1800s into the 1950s.



Microsoft scrambling to secure Web services

■ BY JOHN FONTANA

Microsoft this week is scheduled to plug a major gap in its perimeter security software by integrating a partner's XML filtering and acceleration technology into its firewall and caching server. The move is designed to let corporate users secure the flow of Web services traffic.

At its 11th annual Tech Ed conference in San Diego, Microsoft plans to showcase XML upgrades to Internet Security and Acceleration (ISA) Server 2004. ISA is an

See Microsoft, page 14

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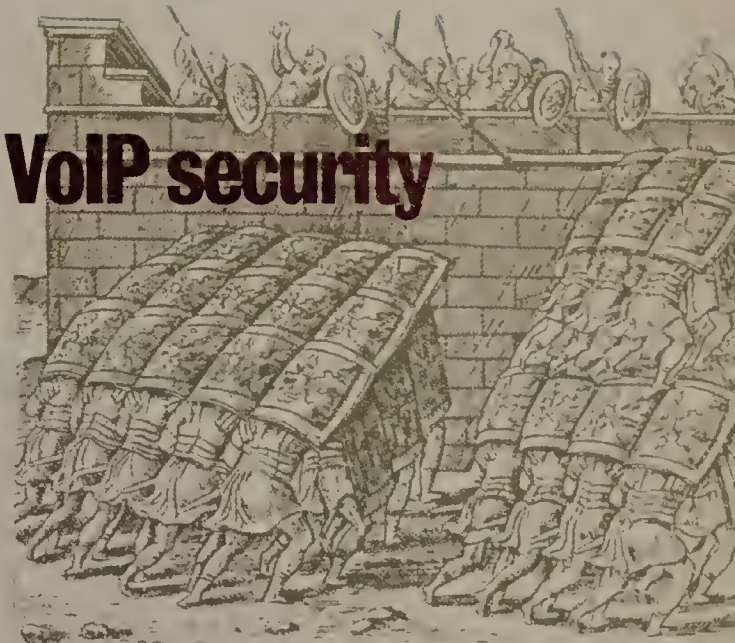
Toshiba's Portege M205 has a swivel screen. Page 76.

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Exclusive

Inside 10G Ethernet testing

Network World Lab Alliance member David Newman discusses the ins and outs of testing 10G Ethernet gear. **DocFinder: 2133**

Network World Mini Showdown: Security: Build it or buy it?

Bruce Schneier of Counterpane Internet Security and Nir Zuk of NetScreen Technologies debate whether it's best to buy components and piece together best-of-breed custom defenses, or simply procure security as a service and leave the driving to the experts? **DocFinder: 2052**

Network World Mini Showdown: The New Data Center

Network World's John Gallant moderates a presidential-style debate (complete with mud-slinging) between two innovative vendors of equipment for the new data center: Redline and NetScaler. Hear them duke it out over which vendor has the best offering for your data center. **DocFinder: 2053**

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Columnists

Wireless Wizards

Is 802.11a like Betamax? The Wizards answer the question: "Is 802.11a the Betamax vs. VHS of wireless networking? Why haven't companies adopted 802.11a?" **DocFinder: 2134**

Nutter's Help Desk

Learning more about how viruses and worms work Help Desk Guru Ron Nutter looks at free resources you can use to better protect your network. **DocFinder: 2135**

Small Business Tech

Rethinking e-mail management Columnist James Gaskin says with viruses and spam, e-mail server duty costs more than you think. **DocFinder: 2136**

HomeLAN Adventures

Creating a hybrid wireless and power-line network Although setup took too long, columnist Keith Shaw says that in the end, the technologies played well together. **DocFinder: 2137**

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News

Bits

Tellabs to pay \$1.9 billion for AFC

■ Tellabs is buying Advanced Fiber Communications for \$1.9 billion, bringing high-speed access gear to Tellabs' portfolio and a five-year contract to provide fiber to the premises gear to Verizon. The deal, expected to close by year-end, will result in a company that can provide access and transport gear to major carriers. Tellabs historically has been a major supplier to the RBOCs of digital cross-connect transport switches — circuit switching gear. The acquisition represents another step in the reshaping of Tellabs to supply packet-based gear to service providers. That transformation has meant massive layoffs and aggressive acquisitions of technology that let the company branch out into new areas.

Symantec, Entrust buying anti-spam companies

■ Anti-spam companies were popular acquisitions last week, as Symantec announced it has signed an agreement to purchase anti-spam gateway software vendor Brightmail for \$370 million and Entrust said it has agreed to buy Canadian firm AmikaNow, a provider of e-mail content scanning and anti-spam tools, for an undisclosed price. Symantec four years ago took an 11% equity stake in Brightmail, which has integrated Symantec's anti-virus filtering technology. Symantec already offers an enterprise product called Symantec Mail Security for SMTP Gateway that includes Symantec's anti-spam technology.

ICANN wins a round in battle vs. VeriSign

■ A federal judge has dealt a setback to VeriSign in its lawsuit against the Internet Corporation for Assigned Names and Numbers, the nonprofit corporation responsible for managing the Internet's DNS. Judge A. Howard Matz dismissed VeriSign's claim that ICANN had violated anti-trust law by stifling the introduction of new VeriSign services, but the judge gave the Internet domain name registrar until June 7 to try again to make its anti-trust argument. VeriSign filed the suit against ICANN in February alleging that ICANN has strayed from its 1998 charter agreement to be a technical coordination body and has hampered the introduction of VeriSign services such as internationalized domain names and a wait-list service for expired domain names. The ruling covered only the first of seven claims VeriSign made, according to a company spokesman. The other six claims allege breach of contract, covering a 1998 agreement between VeriSign, ICANN and the U.S. Department of Commerce, which was renewed in 2000, he said.

Group forms to advance enterprise architecture

■ A band of IT executives have teamed to launch an alliance, the Enterprise Architecture Interest Group, which aims to help companies develop and share tips on building well-structured IT systems. The fledgling group plans to release next month its first creation, a set of 12 meta models intended as architectural building blocks. It also has working groups studying ways to measure the benefits of formalizing an enterprise architecture,

COMPENDIUM

Honeypot to go

The Honeywall CDROM is an entire open source system on a disk for watching hackers try to get into a system. It consists of a "minimized" version of Linux along with all the tools you'd need to quickly start tracking the miscreants.

Download it at www.nwfusion.com, DocFinder: 2138.

The Good The Bad The Ugly



Knock on wood.

We're a little worried about getting splinters, but otherwise it seems like Swedish company Swedx has a good idea for spiffing up the office. The company makes wooden keyboards, mice and computer monitors, and says it plans to show them off at this week's Cebit America. ➤



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Interop leftover.

We've all heard of classic IT companies started up in garages, but here's a new one. One panel leader earlier this month at NetWorld+Interop accosted a panel member to ask him why he hadn't registered for the show. The puzzled speaker insisted he had, only to realize upon looking more closely at his badge that he'd accidentally registered for the neighboring International Garage Door Exposition.



Cell songs. What's worse than having a ringtone version of "When the Saints Go Marching In" interrupt a meeting, movie or other activity? Try having to hear a nearby cell phone user doing a karaoke version of OutKast's "Hey Ya." We're afraid it's true: Engineers at Sharp and Toshiba have come up with new handsets that can double as portable karaoke machines. Naturally enough, the phones will become available first this year in Japan.

and developing value models for use by EAIG members and their organizations. Founding member Richard Taggart, chief architect at General Motors, said EAIG's goal is to create standards, methods and practices for enterprise architecture. For now, the group is excluding vendors, preferring to stay vendor-neutral and base its work on users' input.

Lawmaker urges CAN-SPAM enforcement

■ The chairman of a U.S. Senate committee called for more federal enforcement of a new anti-spam law amid reports last week that the amount of spam sent to U.S. consumers might be rising, not dropping, since the law went into effect in January. Sen. John McCain (R-Ariz.) questioned why the Federal Trade Commission hasn't focused on the companies using spammers to advertise their products while that agency attempts to enforce the Controlling the Assault of Non-Solicited Pornography and Marketing Act. The FTC and federal law enforcement officials brought CAN-SPAM and other charges against two alleged spamming companies in late April, but McCain urged the FTC and the FBI to step up their enforcement efforts against spammers, including child pornography spammers. Representatives of spam-filtering service Postini and the Consumers Union told the committee that the amount of unsolicited commercial e-mail continues to rise after CAN-SPAM became law. Postini, which processes about 1.3 billion e-mails per week, has seen the percentage of spam in that e-mail processed increase from 78% to 83% since CAN-SPAM went into effect.

Bill would offer tax credit for tech training

■ The Computing Technology Industry Association cheered the introduction of legislation in the U.S. House of Representatives last week that would let many taxpayers, including employers and laid-off workers, receive a tax credit of up to \$4,000 per year for technology training. The Technology Retraining And Investment Now Act of 2004, known as the TRAIN Act, would allow the tax credit on qualified expenses used for technology-related training. Workers could get 50% of their training costs reimbursed each year, getting up to \$4,000 back. In some economically poor areas, workers could get up to \$5,000 of training costs given back in the tax credit. The credit could be used by employed and unemployed workers, and employers.

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Cometa succumbs, Wi-Fi carries on

■ BY DENISE PAPPALARDO

Big-name backers, bravado and media fanfare might get a start-up momentum when launching, but they weren't enough to keep Wi-Fi service provider Cometa Networks afloat.

Last week Cometa announced its demise only 17 months after debuting amid much hoopla.

Industry watchers say the failure says a lot about Cometa, but not necessarily much about the future of Wi-Fi.

"This is more of an isolated event," says Amy Cravens, a senior analyst at In-Stat/MDR. "Cometa came out of the chute with big plans...but it wasn't the right time or the right place."

Backed by AT&T, IBM and Intel, Cometa boasted that it would change the face of the public Wi-Fi service market with its wholesale approach. The company promised to build 20,000 access points in two years, but managed only about 200.

In December 2002, investors scoffed at the possibility that Cometa was trying to do too much. "Apax [Partners] and 3i [Cometa's two investors] have

Coming up short

Cometa initially promised 20,000 hot spots in 50 markets but delivered only

200

hot spots in a dozen areas before closing shop.

very substantial [financial] capabilities," said Ted Schell of Apax. "We don't see any problems around [Cometa] having enough capital to carry this out."

The company was funded with about \$5 million to \$6 million, according to reports, and that was enough to get it off the ground.

"They wanted to get big carriers and get them to commit big dollars for a network they were going to build," says Dave Hagen, president and COO of Boingo Wireless, a public access Wi-Fi network aggregator. That means that Cometa wanted the service providers to pay for its network build-out, and that wasn't attractive to

many, he says.

If the carriers weren't willing to kick in more, neither were Apax nor 3i, both of which also sat on Cometa's board of directors. Cometa CEO Gary Weis and Intel held the other two board seats. The board ultimately decided to shutter the company after investors came to the conclusion that their estimated ROI wasn't going to be enough, says Kent Hellebust, vice president of marketing at Cometa.

There were signs six months ago that Cometa was not going to meet its deployment goals, Cravens says. "And then Wayport won the McDonald's hot-spot

contract, which was supposed to be Cometa's," she says.

Although the company had trouble executing as a successful business, AT&T, Sprint and iPass all used Cometa hot spots to support wireless LAN services. None seem publicly concerned that Cometa is going away.

"The impact on customers will be minimal," an AT&T spokesman says. "We expect a high number of Cometa [hot spots] to be served by other Wi-Fi providers."

Cometa says it is working with all its customers to determine the best course of action in spinning down the business. Hellebust says "it's up to each venue" to deter-

mine what will happen with each hot spot. Although Cometa owns the hot-spot gear, the company says its customers will have the ultimate say in what happens to this gear.

Sprint says Cometa's demise will have no effect on its plan to have 10,000 hot spots deployed by year-end. Sprint says it now has 2,300 hot spots. And of iPass' 9,750 hot spots, the service provider says Cometa only serves 97 of them, with the largest concentration in Seattle. A company spokesman says iPass has roaming agreements with seven other Wi-Fi providers in Seattle and doesn't anticipate coverage problems. ■

Contest brings out entrepreneurial spirit

■ BY NETWORK WORLD STAFF

Some propose a better way to build wireless networks. Others are focused on improving networks for vertical markets, such as health-care. Still others think they can help companies migrate from legacy to IP networks more easily.

Entrepreneurs zeroing in on issues such as these were among the nearly 60 people who have entered *Network World's* "Who Wants to be an Entrepreneur?" contest. Entrants' job descriptions range from network managers at large and small companies to those in consulting or at vendors.

The winner, to be announced in *Network World* on June 28, will receive \$30,000 in cash and services.

Entries, many of which flooded in on the contest deadline day of May 17, are now in the process of being vetted by a judging panel of *Network World* editors, venture capitalists and others.

The contest, developed by *Network World* in conjunction with Commonwealth Capital, a venture capital firm in Wellesley, Mass., is sponsored by public relations firm fama PR of Cambridge, Mass., service provider Qwest Communications of Denver and the law firm of Testa, Hurwitz & Thibault of Boston. ■

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RFID expectations vary

■ BY ANN BEDNARZ

CHICAGO — Retailers expressed divergent views of the revenue-generating potential of radio frequency identification technology at last week's Retail Systems conference. Executives from Wal-Mart, Marks & Spencer and Target said it's possible to make a business case for using RFID in the supply chain today, while others expressed less optimistic assessments of payback potential given the technology's current level of maturity.

"One of the greatest benefits will be increased sales," said Michael Duke, an executive vice president at Wal-Mart, in his keynote address at Retail Systems. The Bentonville, Ark., retail giant is about four weeks into its first live RFID pilot, which covers 21 products from eight suppliers passing through Wal-Mart's Sanger, Texas, distribution center and into seven of its retail stores.

An RFID-enabled supply chain will help companies be more productive, better manage expenses and improve inventory turns, but the technology's potential to reduce out-of-stock items and feed sales is most compelling, Duke said.

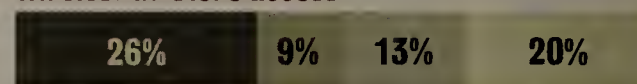
Minneapolis-based Target also championed RFID's potential to improve merchandise availability.

"It's still alarming the amount of times we're out of stock," said Paul Singer, CIO at Target, which in February announced plans to require its top suppliers to begin shipping RFID-tagged pallets and

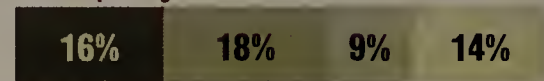
IT priorities

Retailers are investing in store communications technologies and supply-chain enhancements, according to Gartner.

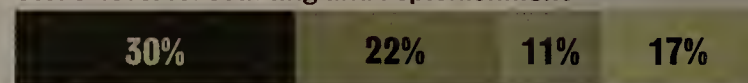
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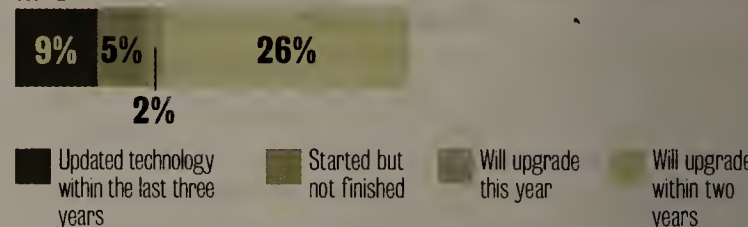
IP telephony



Store-level forecasting and replenishment



RFID



cases next year. Industry experts estimate retail out-of-stock conditions hover between 5% and 10%, and cost retailers billions of dollars in lost sales each year.

Singer sat beside Linda Dillman, his CIO counterpart at Target's arch-competitor Wal-Mart, in an RFID roundtable at the Retail Systems show and quipped about the two holding hands as a sign of solidarity in promoting global RFID standards. "If we don't do this in one, standards-based way, the chances of this being successful go way down," Singer said.

At a retail RFID symposium

held in conjunction with the show, Marks & Spencer outlined its use of RFID in its food operations. The U.K. retailer has tagged 3.5 million trays used for transporting perishable items among suppliers and stores, said James Stafford, head of RFID at Marks & Spencer. The rationale for using RFID tags as opposed to traditional bar codes — which must be visible to scanners and read individually — is simple, Stafford said. Marks & Spencer can read RFID tags faster, which saves time and money.

Stafford acknowledged the

See Retail, page 20

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WLAN switch execs come to dinner

Start-up chiefs chat up technology concerns and marketplace battles.

■ BY NEAL WEINBERG

LAS VEGAS — At last year's *Network World* dinner with top executives from some of the leading wireless LAN switch start-ups, the talk focused on access points, chipsets and radio frequency beams. This year, the conversation centered on partnerships, the channel, horizontal markets and, of course, an 800-pound gorilla called Cisco.

Yes, the WLAN switch market has grown up over the past year. From the vendors' perspective, technology concerns, such as standards and security, have been largely addressed. Products are shipping. Now the task is building a sales infrastructure

vendor, selling its VoIP-centric "switch on a chip" technology to other systems vendors. "In the last year a lot of things were sorted out," Machlin said. "One of the things we discovered was that our value-add was really embedded in core technology."

In a second-floor room overlooking a Vegas version of Venice's St. Mark's Square, the vendors were upbeat about the way the market is responding to their products and passionate about the idea that WLANs will revolutionize corporate networks. And despite the fact that they compete for customers, they never sniped at each other — they saved that for Cisco.

After ordering wine and chatting for a bit, we closed the windows to muffle the singing of the gondoliers and got down to business. Here are highlights of the wide-ranging conversation.

None of the privately held companies would talk about revenue numbers, but they all maintained that the market has grown significantly. "A lot of people were evaluating technology last year, and this year they're actually buying," Vogt said. "The pace is definitely picking up in terms of companies spending real money."

Galloway identified two major trends that occurred over the past year. First, customers began moving from pilot projects to enterprise-wide deployments; and second, the market moved from narrow verticals such as education, medical and retail, to a broad horizontal market.

He said the vertical markets were a good proving ground for wireless technology. The vendors identified and addressed weaknesses such as scalability and management feature. Today, technology is less of a focus for these CEOs.

LeBeau said his top priorities are building "a distribution model that is an extension of our service and support model" and putting together a business infrastructure that can scale.

Vogt said partnerships are at the top of his list.

Speculation has been rampant that Cisco and other wired switch vendors would gobble up some of these start-ups. They all refused to bite, however, when asked if Cisco had approached them. They did point out that the



Airespace CEO Brett Galloway, top left, Trapeze CEO Jim Vogt, AirFlow CEO Bob Machlin, right, and Aruba CEO Don LeBeau, seated, attended *Network World's* second WLAN switch start-up dinner in Las Vegas.

universe of possible suitors goes far beyond the usual suspects.

"There's a tremendous opportunity for partnerships and not just with data and voice infrastructure vendors," Vogt said. "The endpoint is personalized services, being able to deploy services to a person vs. assigning network attributes to a port. It's much more intense when you have mobility mixed into the equation, where you identify a user and assign a policy and services, and those policies and services travel with users as they traverse the network. If you view it that way, it's not about wireless, it's about mobility, and there are huge opportunities on multiple levels in terms of partnerships."

As the dinner progressed from insalata to pasta, the conversation inevitably turned to the meat of the issue: Cisco. All of the vendors acknowledged that Cisco is the market leader, with somewhere about a 60% share. But they maintained that when it comes to wireless, Cisco just doesn't get it.

The CEOs scoffed at Cisco's most recent announcement, an \$18,000 WLAN Services Module that fits into the Catalyst 6500 switch. The announcement is part of Cisco's Structured Wireless Aware Network (SWAN) architecture, which is based on the idea that customers should add wireless features to their existing wired switch network.

"I don't think they have yet figured out what problem they need

to solve, despite the announcement of their SWAN architecture and the point product announced today," Machlin said.

Vogt added that for the amount of money a Cisco customer would pay for one module, his customers could buy enough access points and WLAN switches to set up a whole wireless network.

"The major difference between the incumbent vendors and this group is that we fundamentally believe 802.11 requires a purpose-built infrastructure to optimize things people are trying to do, as opposed to just trying to say it's a feature on the wired network," LeBeau said. He said the incumbents such as Cisco, Foundry Networks and Extreme Networks understandably are trying to protect their flanks from the wireless onslaught, but the momentum is on the side of the pure play wireless vendors.

So, why does Cisco still dominate the market?

LeBeau put it this way: "Customers who are uninitiated make the decision to go with the incumbent vendor because it's safe and comfortable. The reality is that the customer who becomes initiated soon learns there's a better way to do it and that's the target market for us."

It's not about getting customers to replace their Cisco gear, Machlin said, because customers still will be Cisco shops and a good percentage probably still will have some Cisco access points

in their networks. It's about winning over customers when they move from pilot to full-blown deployment.

That's where the start-ups, with their thin access points and smart switches, think they have a major advantage over Cisco's fat access point model. "It's decentralized vs. centralized," LeBeau said. With the Cisco model, the logic and processing power is at the edge of the network, so if a customer needs to make a change to their security settings to combat a new threat, the customer has to touch every access point. "It's a very disruptive approach. It's labor-intensive, and it's very insecure," he said.

Voice technology has generated quite a bit of buzz lately, and the vendors agreed that there's a synergy between VoIP and WLAN technologies. "VoIP over wireless LAN is a significant driver for VoIP in general," Galloway said.

As the waiter brought a round of espressos, the conversation turned to the long-range trend toward mobility.

"In addition to economics driving the transition from wired to wireless, there's a more fundamental drive, which is that personal communications wants to be untethered," Galloway said. "You see this in the transition from wired phones to cell phones, in the home from wired phones to cordless phones, in the rise of PDAs and laptops."

LeBeau summed it up this way: "Wireless will be the primary connection. And you can economically prove that to be the case. Today we have technology that is going through an evaluation, and it will become as predictable and reliable as the blue cable. It's inevitable that it will. And when it does, the economics will drive the entire edge of networks to be wireless. When that happens, the way you build networks will entirely change."

As we left the restaurant, the CEOs expressed confidence that their start-ups would be around a year from now and said they looked forward to another dinner of fine food, wine and conversation. Noting that it took each of them at least 20 minutes to locate the restaurant amid the hotel's maze-like corridors of malls and canals, we agreed to reconvene at an easier-to-find location. ■

What has been your biggest surprise over the past year?

Airespace's Galloway:

"Once customers have a wireless infrastructure, the infrastructure sucks applications into it."

Aruba's LeBeau: "How rapidly it's become horizontal. The other surprise is how few people we talk about ROI with. The demand is so high."

AirFlow's Machlin: "On the application side it's voice — I don't think our conversation last year even mentioned the word 'voice.'"

that can win business in this highly competitive market.

Toward that end, two of the vendors from last year's *NetWorld+Interop* dinner — Aruba Wireless Networks and Trapeze Networks — recently brought on sales-savvy industry veterans as CEOs. The new faces in our private dining room at Canaletto's in the Venetian Hotel were Aruba's Don LeBeau (formerly of Data General, IBM and Cisco) and Trapeze's Jim Vogt (formerly of Bay Networks, Nortel and Ingridian).

Airespace CEO Brett Galloway returned for a second year, as did AirFlow Networks CEO Bob Machlin. But AirFlow recently dropped out of the WLAN switch derby and is now a component



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Novell

Microsoft

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application-layer firewall, VPN and caching server.

The platform will get its XML boost from Forum XWall, a Web services firewall from Forum Systems. The add-on component is integrated into the ISA Server Console. XWall inspects XML messages to authenticate data, validate schema and check for malicious content.

Support for XML in ISA Server 2004 lets corporations secure XML-based Web services applications and will contribute to the building of a service-oriented architecture. The absence of an XML firewall had drawn criticism from users and analysts. With ISA 2000 (which was released in 2001), Microsoft only provides an Internet Server API (ISAPI) filter for validating XML messages.



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"This has been one shortcoming of the product," says Peter Pawlak, an analyst with research firm Directions on Microsoft. "Web services is like calling a function, so you have to look at the messages through careful inspection. You have to ensure the messages are well-formed XML, that they adhere to current parameters and do not have any malicious code injected."

In addition to packet inspection, the Forum XWall for ISA Server 2004 is expected to provide acceleration of XML traffic, which is very CPU-intensive because each message must be opened and parsed.

XWall for ISA Server 2004 provides data-level authentication, schema validation, XML intrusion prevention and support for the WS-I Basic Profile, a set of guidelines to ensure interoperability across disparate products.

"The 2000 version of ISA was a red-headed stepchild, but ISA 2004 should be ready for prime time," says Wes Swenson, CEO of Forum, which competes with DataPower, Layer 7 Technologies, Reactivity, Sarvega, Vordel and

Perimeter security

Microsoft plans to unveil Internet Security and Acceleration Server 2004 next week, the first new version of the firewall and caching software since its introduction in 2001. Here is a look at the pros and cons of the server, set for general availability in July.

Pros

VPN filtering: VPN natively supported through VPN network type.

New user interface: Replaces the standard Microsoft Management Console plug-in used in ISA Server 2000.

Multi-network capabilities: Replaces single-network support with unlimited multiple networks and types (internal, external, VPN, DMZ).

Cons

Lack of SIP application proxy: Needed to support handling of voice and video using Session Initiation Protocol.

No IPv6 support: Adds support for IPSec Tunnel Mode but left out IPv6.

Web services proxy missing: Microsoft plans to add capability in final release through licensing deal with Forum Systems.

Westbridge Technology. Traditional firewall vendors, such as Check Point, also offer XML traffic inspection capabilities.

XML support is just one addition to ISA Server 2004. Celestix Networks will introduce a firewall, caching and VPN appliance based on ISA Server 2004. Ava-

nade, a systems integrator formed by a joint partnership in 2000 between Accenture and Microsoft, will introduce VPN Quarantine for ISA Server 2004, which assesses the configuration of a client system before it can connect to the network.

Windows Server 2003 and ISA

Server 2004 provide rudimentary quarantine technology that lacks assessment capabilities, according to Craig Nelson, systems engineer for Avanade. VPN Quarantine will provide those capabilities and add an administrative interface for setting rules and policies.

Microsoft is making a big push to upgrade its quarantine technology, including server enhancements in Windows 2003 Service Pack 1, due next year, and Update, which is due next year. The company also is working with anti-virus vendors such as Trend Micro.

Security will be a main theme at Tech Ed, which is expected to draw 11,000 IT professionals. Also on the docket is a preview of management software, including System Center 2005, patching tools such as Windows Update Services, and other forthcoming products such as SQL Server 2005 and Visual Studio 2005. Microsoft also plans to release Service Pack 1 for Exchange Server 2003.

But Longhorn, which was the main area of focus earlier this month at the Windows Hardware Engineering Conference, is not on the docket.

"TechEd is where we start to make things real and people can get their hands on the technology," says Harley Sipner, senior product manager for the Windows Server System at Microsoft.

Meanwhile, patch vendors PatchLink, Bindview and ConfigureSoft are expected to introduce products.

Integration vendor Vintela will introduce Authentication Services, which allow authentication of Unix and Linux systems through Active Directory, and Management Extensions, an add-on to System Management Server 2003 for managing Unix and Linux desktops and servers and Macintosh desktops. WRQ plans to announce the new version of its host-access software Reflection, which includes new security, management and customization features.

On the Exchange front, KVS will show its Enterprise Vault 5.0, for archiving and managing e-mail, Microsoft file system documents, instant messages and SharePoint documents. Sybari Software will unveil Antigen 8.0 for Exchange, Advanced Spam Manager and the Sybari Enterprise Manager. ■



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Microsoft redirects Commerce Server

Feature Pack 1 is first steps of revived plan that follows the demise of Jupiter.

■ BY JOHN FONTANA

In the ashes of its disbanded Jupiter project, Microsoft last week revived its e-commerce server with the introduction of a new feature pack and a promise that the next version will ship in 2006.

With Feature Pack 1 for Com-

merce Server 2002, Microsoft has updated the interfaces of its Business Desk client software, which let product and marketing managers maintain an e-commerce site with little IT intervention. The company has added a more Windows-like, tree-menu navigation, and reinforced management of catalog content and product-discount services offered online. Also new is a feature that allows for multi-environment staging across firewalls of commerce sites for easy review before those sites go live, and support for coupons and online promotion codes.

While Feature Pack 1 is available now, the next major upgrade of Commerce Server, code-named VNext, won't ship until 2006.

"Given the changes around Jupiter, we wanted to reaffirm our commitment to Commerce Server," says Stacey Ellingson, product manager in the business process and integration division at Microsoft.

Commerce Server provides tools for building and maintaining online commerce sites, including user profile management, personalization, merchandising, catalog management,

order processing, globalization and online business analytics.

Announced in 2002, Jupiter was an effort to integrate BizTalk Server, Commerce Server and Content Management Server into a suite. It was to compete with Java-based middleware bundles from BEA Systems and IBM for supporting content-rich, process-driven business applications. Microsoft scrapped Jupiter earlier this year when customers said they did not want to buy the products as a suite. The company said it still would build integration between the individual products.

"With IBM pushing on WebSphere and BEA with its commerce platform, I don't see Microsoft getting out of the game," says Peter Pawlak, an analyst with the research firm Directions on Microsoft. "For a long time Jupiter was the road map. Now they have to assure customers that Commerce Server is not dead."

That effort will get its first boost in the 2006 version when Microsoft will add BizTalk adapters to Commerce Server that make it possible to connect online order-management processes to back-end systems.

Microsoft also will replace the reporting engine in Commerce Server with SQL Server Reporting Services, which can pull together commerce data from multiple business channels, including Commerce Server and point-of-sale terminals. The same reporting services also will find their way into other server products, such as Microsoft Operations Manager 2005, so Microsoft can provide centralized reporting capabilities, experts say.

Commerce Server also will be more closely integrated with Visual Studio 2005 to allow quicker development and deployment of commerce sites. The Visual Studio integration is part of a long-range plan to get all server applications on a common platform that's based on .Net. Microsoft also will provide additional user interface upgrades on par with those in Feature Pack 1 and more self-service features that would let online users check their order status, inventory levels and account information.

Feature Pack 1 for Commerce Server 2002 is available as a free download at www.microsoft.com/commerceserver/.



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Q & A Life after Verizon sees BBN returning to its roots



If you thought Internet and e-mail pioneer BBN had disappeared some years ago, you wouldn't be alone, acknowledges Tad Elmer, the company's president and CEO. Never a huge self-promoter, the consistently profitable research-and-development outfit went into big-time quiet mode when it became part of Verizon in 2000 by way of a merger involving then-parent GTE. Newly independent after being sold off earlier this year, BBN is ready to break its silence. Elmer recently updated Network World Executive News Editor Bob Brown on the 56-year-old company's plans.

How will life after Verizon be different?

Verizon was a good place to be. You certainly knew your paycheck wasn't going to bounce. But there was a significant difference in culture. They are more of a user of R&D than a pusher of it. So one big plus for us is that we can be true to our nature again.

One constraint in being part of a telecom company is that there are a lot of funny rules and regulations, including that the RBOCs are not allowed to own more than a certain percent of equipment makers. And for us to do communications work, our best chance is usually to license technology to people who make equipment to help them differentiate their products or get the products to do something they wouldn't normally do. Verizon was justifiably very conservative about how they approached those things. So we should have more flexibility now about doing deals. It also makes it a little easier if we want to go talk to the other RBOCs.

How much did Verizon drive your R&D direction?

We were operating not entirely independently, but we did the vast majority of our work for external clients. But we did some work for Verizon and are continuing to do it. We spent a lot of time trying to get our technology to help them in their call centers. We also did a security audit for them and looked at how to

minimize crosstalk on DSL.

BBN is known largely for its government work. Should we expect to see you doing more in the commercial market?

We hope so ... carefully and profitably. We go between having 15% and 20% of our work from commercial customers, and we're hoping to expand on that, though we are very focused on keeping existing customers happy. We're still doing the same kind of innovative work we've always done, though I can't guarantee any of the things we're working on now will change the world like e-mail and packet switching have. Check back in 20 years and we'll see. [In light of being sold off from Verizon to BBN's management team and investment firms Accel Partners and General Catalyst Partners], the possibility of us spinning out new companies is on the table, though this is not something we're strongly emphasizing.

How would you describe the overall state of basic R&D?

We have seen interesting work in some areas, like speech and language processing. You saw this trend where government was pushing development of it. The technology got better to a certain point and there were some IPOs and a fair amount of capital put into it. Then it started getting a little bit better and then it stopped getting better, and the reason why is that in the commercial world you have to make a profit or at least be cash-flow positive.

It's hard to keep pushing research. The start-ups generally don't push research hard. We traditionally had huge companies like AT&T with Bell Labs and Xerox Parc or IBM Watson Research Labs. These were big places that were given enough funding to really push forward. But there's such an incredible emphasis on making money and reducing costs now that it seems in speech and networking and other places you don't see zillions of dollars on basic research. If you can tweak things and make them a little better to succeed in the market and get a result quickly, then that tends to happen.

More of the onus has gone back to the federal government to push on research. And to go back to the speech and language processing, we've seen

See Elmer, page 106

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Cisco

continued from page 1

not intended to be an alternative to the used market or a tool for competing with lower-cost vendors, according to Cisco. While the company does not break out sales through its Authorized Remarketing Program, a Cisco spokesman says the program has experienced year-over-year growth.

Economic conditions are forcing Cisco customers to look to the used Cisco market and seek lower-cost alternatives, said Doug Karmin, manager of business development and global remarketing at Cisco, in a recent teleconference with channel partners. Another rising challenge for Cisco is third-party resellers aggressively calling Cisco's existing customers to offer inexpensive refurbished products.

"We're starting to see a lot of competition from different categories," Karmin said. In addition to used equipment makers, there are vendors such as Dell and

Huawei Technologies "coming at [Cisco] less on functionality and more on price."

Karmin mentioned an unnamed federal government agency that balked at Cisco's pricing for new Catalyst 6509 switches on a large RFP, and looked into Foundry Networks, which offered deep discounts. "When we came back with [refurbished] Catalyst 6000s, we got the deal," worth more than \$1 million, he said.

He also said companies that buy used Cisco gear from authorized channels have an easier time getting software licensing and support because they are included with the sale of a Cisco Authorized Refurbished Equipment product.

"If I go out and buy a box off of eBay, not only am I ineligible for a Cisco warranty, I have to buy a software license and pay for a Cisco inspection to make sure the box is in working order," before support can be purchased, Karmin said.

Cisco wouldn't disclose costs for performing the inspections.

Deals to be had

Cisco is competing with its own used gear in the refurbished router and switch market. NHR, a used Cisco reseller, beats Cisco on prices of products that have been on the market for more than two years (Cisco tops NHR on the 3700 router because it is a newer product). Here is a sample of new and used equipment from Cisco and NHR:

Product	Cisco list price	Cisco Authorized Remarketing	NHR
Catalyst 6509 switch chassis*	\$9,500	\$6,462	\$4,500
Catalyst 2984G switch	\$6,000	\$4,190	\$1,900
3700 four-slot router	\$12,000	\$6,615	\$7,900
32M bit memory for 2600 routers	\$950	\$662	\$125

*New product without power supply/used includes power supply.

SOURCES: CISCO'S DISTRIBUTION PRODUCT REFERENCE GUIDE WEB SITE, CISCO AUTHORIZED REMARKETING PROGRAM WEB SITE, NHR.

As for firms that are in the business of reselling used gear, he added, "there aren't two or three 800-pound gorillas in this market. It's a lot of little guys."

Searching on Google for "used Cisco routers" brings up hundreds of options. Among the leaders in the sub-industry is Network

Hardware Resellers (NHR), which buys network equipment from companies, carriers and leasing firms, then reconditions it for resale to corporate customers and carriers. NHR offers 90-day warranties on its refurbished units, as well as licensing for IOS software. Users also can buy Cisco's SmartNet support contracts through NHR. The 4-year-old firm, which says it had \$50 million in revenue last year, specializes in enterprise products, selling 95% of its gear to businesses.

Chuck Sheldon, NHR founder and president, says his company's relationship with Cisco is "touchy."

"Cisco is doing anything they can to put roadblocks in front of customers who are considering buying equipment from vendors like us," he says, regarding Cisco's requirement that used gear be relicensed and inspected by Cisco technicians before warranties and support can be obtained.

While Cisco categorizes firms like NHR as gray market and warns customers against using them, Sheldon says his firm is good for Cisco and users. "We're giving [users] products at good prices, and keeping them on as Cisco customers. How is that bad for Cisco?" he says. "We're not out there selling Nortel or 3Com."

Just the right medicine

St. Joseph's Health System in Orange, Calif., is one NHR user. Through an IT management outsourcer, the hospital has purchased production and spare Catalyst 6500s, 7500 routers and 2900 switches.

"We've been able to do many network upgrades despite budget constraints," by purchasing through NHR, says Robert Van Vuren, a senior network architect for Perot Systems, which man-

ages all of the hospital's IT duties from purchasing to operations. "It allows us to do more with less."

Chris Lukas, CTO of emerging technologies for online brokerage firm Hold Brothers, also buys used equipment.

"The numerous pieces of used gear I have bought have been flawless and in some cases come in factory-sealed boxes," he says. "I heartily recommend it, and if not for production, then for other uses, like spares or testing."

Lukas questions the lack of Cisco licensing and support for used gear. He'd like to see the transfer of IOS licenses and support on second-hand gear. He sees this as punitive toward customers.

"Why doesn't Cisco take the Mercedes/Lexus viewpoint and try to keep resale values high?" he says. "Cisco seems to want resale values to be zero so there is no competition between new and used gear. If the residual value is zero, what was the gear really worth in the first place?"

Not everyone's sold

While Gartner does not track used equipment sales for specific products, the research firm estimates the overall market for a variety of used equipment — including routers, switches and telecom gear — will grow from about \$1.6 billion this year to \$1.7 billion next year.

"We're not seeing a concerted effort by larger corporations to go out and embrace the used-equipment market," says Lawrence Orans, principal analyst with Gartner. "But if the stars line up and the inventory is there, many midsize businesses are getting what they need at a lower price" through used channels.

Some still prefer new Cisco equipment, viewing second-hand gear as a possible risk.

"We shy away from anything except original equipment," says Jim Olson, CIO for Waterbury Hospital in Connecticut. With Waterbury Hospital network running most equipment — from ultrasound machines, to radiology and even phones — over its Cisco LAN, used gear is not worth the risk, he says. "If something has already been in service and it's put into service again, there is a certain mean time to failure, and you're getting closer to that mean time to failure than when it was new."

Managing Editor Jim Duffy contributed to this report.



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Experts disagree about seriousness of IOS code theft

■ BY PHIL HOCHMUTH

While the FBI and Cisco scrambled last week to recover source code stolen from the network giant, expert opinion differs about how serious a threat the incident is for corporate customers.

Published reports last week said as much as 800M bytes of source code from Cisco's IOS software — the core operating system for its routers — was stolen from a company server and posted briefly on a Russian Web site. The code was taken down shortly after it was discovered.

"Cisco will continue to take every measure to protect our intellectual property, employee and customer information," Cisco said in a statement last week. "Cisco is working with the FBI on this matter."

Some observers say the source code theft poses a serious threat to IOS users, and that the Internet (because many backbones are Cisco-based) might be at risk. With the once-proprietary knowledge of IOS' back doors, hackers could compromise enterprise- and carrier-based Cisco gear and cause havoc. Yet other analysts say the issues are more of a problem for Cisco and the FBI, and less of an end user worry.

"This is a serious issue for Cisco, but not so serious an issue for enterprises," says Frank Dzubeck, president of Communications Network Architects. He says this incident is not like the Microsoft Windows

source code theft in February, through which vulnerabilities were published soon after. The fact that routing is a more esoteric world is in Cisco's favor.

"People have been looking at Microsoft's binary stuff for a long time and they know how the code works," Dzubeck says. For someone to create and publish a vulnerability in IOS that could harm companies, he would have to understand how IOS works, and how it links to other modules.

"It's very different from PC software," Dzubeck says. "And there are much fewer people who know IOS than people who know Microsoft."

Another observer is more pessimistic.

"I believe there's an immediate, impending threat out there," regarding the IOS code theft, says Babak Pasdar, CTO of IGXglobal, an IT

security firm. He says because IOS is a proprietary operating system, part of its security is that the public can't view back doors and vulnerabilities in the code. With the code out of the bag, malicious users could comb through holes known only to Cisco.

"I would bet dollars to doughnuts that Cisco is sitting on a whole bunch of vulnerabilities [in IOS] that are not public," Pasdar says. "The right thing for Cisco to do is to make public all of its known vulnerabilities and back doors to IOS."

The IDG News Service contributed to this report.

"I would bet dollars to doughnuts that Cisco is sitting on a whole bunch of vulnerabilities [in IOS] that are not public."

Babak Pasdar
CTO, IGXglobal

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Dave Chacon

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Pneumatic

continued from page 1

between offices, factories, hospitals and stores. As president of Pneumatic Tube Products in Haywood, Calif., Moeller builds pneumatic tube networks, which in a sense were among the original LANs and MANs.

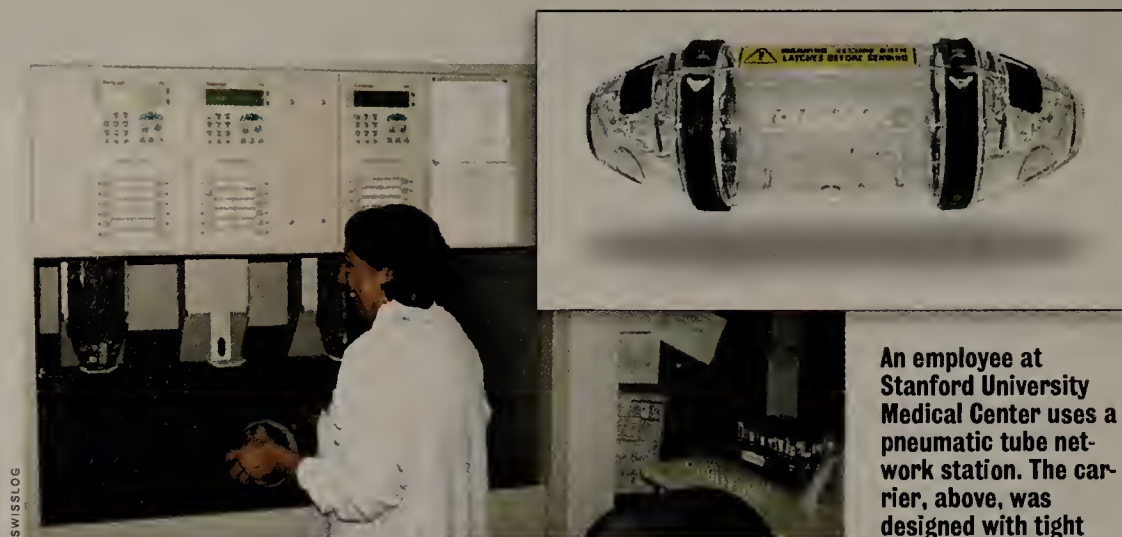
While the heyday of pneumatic tubes was in the late 19th and early 20th centuries, they haven't entirely gone away despite the rise of the Internet and high-speed corporate nets.

At San Antonio Community Hospital, in Upland, Calif., paperwork and medications shoot through the building in less than a minute, according to Bob White, who runs the hospital's tube network. Without it, San Antonio probably would have to hire 15 people to handle the 1,200 to 1,800 transactions per day, he says. By contrast, the computer-controlled tube network is virtually cost-free apart from quarterly maintenance.

But hospitals aren't the only places using tubes. Facilities that deal with trucks still handle a lot of paper forms, because there are so many different computer systems in use among trucking companies that it's hard to work with all of them, Moeller says. One lumber company in Northern California is interested in tubes because it says paper is the fastest way to deal with shipping.

"They need the paperwork *now*," he says. "The system we're going to put in for them is going to handle about 20 orders a minute."

Routing is now controlled by software — a



An employee at Stanford University Medical Center uses a pneumatic tube network station. The carrier, above, was designed with tight seals to carry liquids.

Windows XP-based system, in Pneumatic Tube Products' case. Users enter a code for the destination at a terminal when they drop off the carrier, and the software controls a mechanical "transfer unit" that handles the carrier at points where different tubes meet.

History lesson

Over the years, depending on where they were and who built them, pneumatic tube networks might carry documents, special postcards, regular mail and telegrams hot off the long-haul copper.

The technology is based on a simple premise: Push air into a tube and it will take whatever's in the tube along with it. Reduce the air pressure and things will get sucked backward. Using that principle, a postal agency could solve a serious congestion problem on the largely unregulated network called city streets.

"Traffic was a mess in the big cities ... and to have one of its mail wagons sitting in traffic for 20 minutes while two horses are fighting or someone doesn't want to give up the right of way, it's a waste of time," says Nancy Pope, a historian at the National Postal Museum, part of the Smithsonian Institution in Washington, D.C. Letters moved between post offices in U.S. cities at about 35 mph, she says.

By the early 20th century, Philadelphia, New York, Boston, Chicago and other U.S. cities had pneumatic networks, as did Paris, Berlin and London. But when business districts shifted around and post offices had to be moved, it proved difficult to reroute the underground tubes, Pope says. Then traffic became smoother when cars took over.

Few postal networks soldiered on after World War I, but the story wasn't over for private tubes. Almost every department store in the U.S. had tubes carrying cash and paperwork in the 1920s and 1930s, says Craig Swank, a marketing and communications director at Swisslog North America, one of only a few big companies left making tube networks.

As the networks grew, the technology got more complex. Routing was needed, first in the form of rooms full of human operators picking up a carrier from one tube, reading its destination address and dropping it off at another "station" to go into another tube. Starting in the 1950s, switching went electro-mechanical, with the address encoded using a dial or a set of magnetic bands on the out-

side of the carrier, Swank says.

Then credit cards came along, easing up on the need for cash handling in stores. Companies started using e-mail. Tubes lost their effect for communication.

However, Swank contends that, "You don't need that use out of a tube system to even come close to justifying it."

The future, it turned out, was in carrying things that can't be e-mailed or faxed. Business is still big, relatively speaking, in healthcare, Moeller and Swank say.

And while the age of postal tubes might be over, one New York entrepreneur wants to see information go through them again. The New York Mail and Newspaper Transportation Co. abandoned the 27-mile network it operated in the 1950s, leaving behind underground tubes up and down Manhattan. Randolph Stark, looking for a way to wire two office buildings with one connection to a carrier's fiber in 2001, remembered having heard of it.

It could be a gold mine, Stark thought: a ring of 10-inch-wide metal tubes with the long, graceful curves that optical fiber needs, running underneath some of the most expensive real estate in the world. Some buildings once housed post offices, so they had their own way into the network. The pitch could be irresistible to buildings that wanted more capacity: "You know that hole in your basement? Well, we know where it terminates," Stark says he would tell them. New York was just one of many cities with old tubes.

Stark formed a company, learned that the city now owned the tubes, and proposed leasing them. But the city already was considering a similar idea involving old water mains, he says. Then came the Sept. 11, 2001, attacks and the telecom crash. Stark still hasn't actually seen any of the tubes.

"To be honest with you, we haven't done much with this project for a while," Stark says. However, he does have a U.S. patent, issued last year, on a way to use the tubes for fiber.

"That's the only person I know of who's tried to make something out of this," the National Postal Museum's Pope says. But seeing as the tubes have been abandoned for about 50 years and a lot of road work and construction has come since then, they may not be much of a network anymore.

"I can't imagine what's left," Pope says.

Lawson is a correspondent with the IDG News Service's San Francisco bureau.

Retail

continued from page 10

complexity of RFID is off-putting to many companies. "It's difficult and risky," he said. "People like to talk about innovation, but very few like to do it."

That needs to change, Wal-Mart and Target executives say. Retailers and suppliers need to become familiar with RFID. "If you haven't started, get going," Singer said.

Not all retailers agree. Chico's isn't doing anything with RFID right now, said Ajit Patel, CIO of the Fort Myers, Fla., apparel chain. Patel is watching the technology, but so far sees no compelling reason to replace bar codes with RFID tags, particularly on individual items. Down the road Chico's will consider tagging merchandise cases, but not before the technology matures, he said.

Wilsons Leather is also hesitant. "I still think it's too early," said Jeff Orton, CIO of the Minneapolis retailer. He expects Wilsons to adopt RFID, but not now, given its elusive ROI.

RFID veterans offered advice for retailers considering an RFID pilot or deployment.

Focus narrowly, said Dick Lampman, senior vice president at HP, which uses RFID in some of its manufacturing facilities and is among the eight suppliers involved in Wal-Mart's ongoing pilot.

Make it a multidisciplinary project from the start, Target's Singer said. RFID is not just an issue for supply-chain personnel. Network managers need to be involved in decisions about how the data generated by RFID gear is going to be communicated among systems. ■



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WHAT THE INDUSTRY IS SAYING:

- "A lot of service providers are moving to Web-based customer care to enhance their customer care and to increase efficiencies," says Sandra Palumbo, a senior analyst with the Yankee Group. "AT&T is the furthest along at this point. Anecdotal evidence indicates that customers are very pleased with it."

WHAT THE CUSTOMERS ARE SAYING:

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Start Takes

■ The U.S. Patent and Trademark Office last week gave **Rad Data Communications** a patent for its **TDM-over-IP technology**, which the vendor has sold to companies and carriers since 1999. TDM over IP works by encapsulating segments of a TDM voice stream and sending them across a network as User Datagram Protocol/IP packets. A TDM-over-IP gateway on the receiving end gets the packets, synchronizes with the TDM time slot of the sending device and reassembles the voice stream. Rad Data says it has more than 20,000 TDM-over-IP gateways and module cards for PBXs installed.

■ **Hitachi Data Systems** recently announced a new high-end storage array and enhancements to its HiCommand management software. The **Hitachi Thunder 9585V** is the company's largest midrange storage array. It can store up to 64T bytes of data and can attach to as many as 1,024 servers. Hitachi also introduced HiCommand Path Provisioning, which provides end-to-end provisioning of storage resources, and HiCommand QoS for Sybase, which ties storage resources and availability to the popular application. HiCommand Path provisioning starts at \$6,000; HiCommand QoS for Sybase starts at \$5,000; a Thunder 9585V with seven 146G-byte drives starts at \$100,000.

■ **IBM** is using **VMware's virtual machine technology** as a key part of its on-demand computing push for its x86-based systems, including blade servers. The two companies last week announced they were extending an alliance that began in 2002. VMware, now owned by EMC, says the deal calls for IBM to offer its virtualization technology on its servers through 2007. VMware will provide partitioning capabilities on the x86 machines as part of IBM's Virtualization Engine, which Big Blue announced last month to tie together server virtualization, management and provisioning. IBM uses its own partitioning technology on its RISC-based servers.

Blade servers get integrated

■ BY JENNIFER MEARS

Blade servers, those compact slices of computing power that fit into racks like books in a bookshelf, have largely been relegated to running front-end jobs in the data center — tasks such as Web serving, caching and firewalls. But increasingly, business customers are looking to blades for data center consolidation, hoping to run databases and other critical applications on the systems.

Vendors are responding to the demand by adding features and power to blade servers to make them more capable of supporting transaction-oriented applications and higher-performing workloads. They're also working to make it easier for end users to integrate the blades into data center architectures.

Consider earlier this month when IBM announced that it was embedding Fibre Channel switches from Brocade into its BladeCenter systems. That news came about two weeks after IBM and Cisco detailed an expanded relationship that also included integrating Cisco's Intelligent Gigabit Ethernet Switch Module into BladeCenter.

Most of the systems vendors provide SAN and Ethernet connectivity for some of their blade servers, but most require

The competition

While IBM is the first to integrate Brocade storage and Cisco network switching into its blade servers, all the systems vendors are focused on making it easier to integrate blades into data center architectures:

HP

Offers integrated Fast Ethernet and Gigabit Layer 2 managed switches and a patch panel option so that customers can connect directly to their network architecture. Its Storage Connectivity Kit provides a Fibre Channel pass-through connection for SANs for its p-Class blades.

RLX

Includes its own integrated Ethernet switches, and a pass-through card to connect to external switches. For Fibre Channel, partners with Qlogic for pass-through connectivity through a host bus adapter. Also supports InfiniBand by integrating Topspin switches. RLX's Control Tower management software manages RLX and non-RLX blades, and 1U servers.

Sun

Includes up to two integrated GigE switches in its Sun Fire B1600 Blade Platform, but doesn't currently support Fibre Channel. Offers specialty network blades for load balancing and security and provides blade management with N1 Provisioning Server 3.1 Blades Edition.

Dell

Includes up to two integrated Layer 2 managed switches and dual integrated Gigabit network interface cards in each blade.

pass-through boards or other approaches to connect into the network infrastructure. Consequently, users have to run cables from each blade to an external

Fibre Channel or Ethernet switch. For example, HP was the first to offer Fibre Channel SAN connectivity for its blades, **See Blades, page 24**

PolyServe to cluster Windows servers

■ BY JENNIFER MEARS

PolyServe, which specializes in software for Linux clusters, is unveiling a product this week that brings its expertise in shared data clustering to Windows environments with the aim of letting users consolidate stand-alone servers.

PolyServe's Matrix Server for Windows 2000 and Windows Server 2003 is designed to take Windows clustering beyond high availability to support scalable clusters that can be managed from a central location.

Matrix Server takes a different approach than traditional Windows clustering products from vendors such as Microsoft and Veritas Software by letting data be shared across all the nodes in a cluster, says Steve Norall, director of marketing at PolyServe. The key to the software is a clustered file system that lets all servers tied to a SAN share data. In most Windows clusters, one

active node would have access to data, which would have to be moved to the second node in a failover, Norall says.

"With PolyServe all data is seen by all the nodes in the cluster simultaneously, and those servers are virtualized as one entity," he says.

As a result, users can move databases and other applications off of bigger, stand-alone boxes and onto clusters of less expensive, smaller machines, Norall says.

Steve Stone, IT associate at Texas A&M's Department of Food Services in College Station, has run Matrix Server since March to support Microsoft SQL Server running on Win 2000. Previously, the database ran on a four-processor server, but is now on a cluster of two dual-processor Dell PowerEdge 4650s. Stone says he decided to move to the cluster after having problems with downtime.

"The cluster is a single point, but I can

take down a server, and the other server picks up and keeps going," he says. "The data is never offline, and both servers have access to all the data all the time."

Stone says he plans to expand the cluster and expects significant savings because he won't have to run multiple, big boxes.

"We can get smaller boxes and throw them in there, and it acts as one big machine," he says. Matrix Server supports up to 16 servers.

"I like the fact that all the servers share the information. It makes it really easy to scale out because all you have to do is hook up a new server to the SAN, then put the PolyServe software on there and it sees the data right away," Stone adds.

PolyServe plans to launch Matrix Server for Win 2000 and Win 2003 at the Microsoft Tech-Ed conference in San Diego. The products are priced starting at \$1,500 per CPU. ■

New hardware brings 10G LANs closer to reality

Latest products provide corporations with more options to decrease data center and LAN bottlenecks.

■ BY PHIL HOCHMUTH

With the spate of new 10G gear, analysts say, corporations have more options for alleviating data center and LAN bottlenecks.

Just as 3Com and Foundry Networks made 10G product announcements earlier this month at NetWorld+Interop, several 10G Ethernet adapters for servers, workstations and network-attached storage (NAS) devices are being announced this week by Silicon Graphics and start-up Chelsio Communications.

While the 10G market is still young — products are mostly test toys in high-end research and enterprise networks — some corporations, such as hospitals with digi-

“Vendors are recognizing that while not an absolute necessity for customers, [10G] does a play in certain niche markets.”

Max Flisi

Analyst, IDC

tized radiology images stored on servers or financial firms with compute-intensive applications, already are turning to 10G Ethernet.

Among the recent 10G product news:

- Silicon Graphics is expected to announce this week that it will integrate S2IO's 10G Xframe adapter into a line of high-end Intel-based servers, NAS devices and high-end workstations. Linux and Windows can run on 10 Gigabit workstations and servers, while the 10G-enabled NAS

boxes will run a proprietary Unix operating system.

- Chelsio this week is expected to launch its T110, a 10G adapter that includes TCP/IP offload engine (TOE) technology, which lets TCP/IP processing — normally executed in software on a server processor — run on the server network interface card (NIC). This frees server-processing resources and lets users run more powerful applications on fewer machines.

- Foundry announced an eight-port 10G Ethernet switch, aimed at LAN aggregation layers or for connecting clusters of 10G-enabled servers in a high-performance computing cluster.

Foundry's new switch is an eight-port 10G box aimed at companies with large server clusters or small backbones. The Edgelron 8X10G includes eight XFP-based 10G Ethernet ports, which can be outfitted with optics for long- or short-haul 10G over single- or multi-mode fiber. Foundry says the Layer 2 switch can process up to 120 million packets per second on each port.

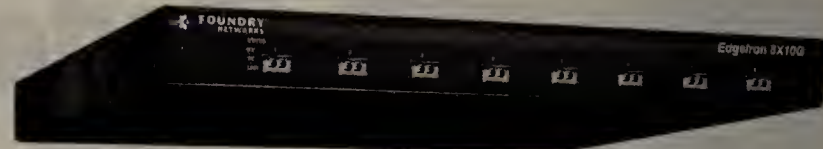
- 3Com released two new 10/100/1000M bit/sec boxes recently that include 10G expansion slots for uplinking to a 10G core switch.

3Com's switch is aimed at wiring closets or end-user work groups where high-speed desktops are used and even high-speed aggregation uplinks are needed. The SuperStack 3 Switch 3870 series includes 24- and 48-port boxes with 10/100/1000M bit/sec Ethernet on all ports. A 10G expansion module is included on the back, and a 40M bit/sec interconnect for 3Com's proprietary stacking technology also is included.

3Com's stacking technology lets up to eight SuperStack 3870s be linked together with a 40G bit/sec backplane. The stack can be managed as one virtual switch, with one IP address. 3Com is touting the switches as a way to plan for

future 10G connections to a 10G core. 3Com currently does not have a 10G module for its Switch 7700 core switch.

“These [switch] announcements are indicative of the general trend that 10G is continuing to gain momentum in the industry,” says Max Flisi, an analyst with IDC. “Vendors are



Foundry's Edgelron 8X10G can link clusters of 10G-enabled servers, or act as a small 10G backbone switch.

recognizing that while not an absolute necessity for customers, [10G] does have a play in certain niche markets.”

Dell'Oro Group estimates that pricing for 10G Ethernet ports will fall from an industry average of about \$9,000 this year, to about \$1,000 per port by 2007.

Meanwhile, Gartner says that 10G NIC prices will drop by 50% over the same time, reaching about \$3,000 per adapter by 2007. Analysts predict that the market for 10G products will grow from \$500 million this year to about \$1.6 billion by 2007.

The 3Com SuperStack 3 Switch 3870 48-port switch costs \$6,000, and the 24-port Switch 3870 costs \$4,000. Both boxes are scheduled to ship next month. Foundry's Edgelron 8X10G also ships next month, with pricing to be released then.

Silicon Graphics servers, workstations and NAS boxes will be available in the third quarter of this year with pricing to be released later.

The Chelsio 10G NICs with TOE capabilities will be demonstrated this week at the GridToday 2004 trade show in Philadelphia, with pricing and availability to be announced later. ■

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Virtual tape gets a boost

■ BY DENI CONNOR

Users of virtual tape got a boost last week with Bus-Tech's introduction of the Mainframe Appliance for Storage for EMC Centera, which lets customers more quickly save and retrieve fixed content data.

Virtual tape is the ability for a disk drive to mimic a tape library for back-up and recovery purposes. A variety of vendors have adopted virtual tape, including established companies such as EMC, IBM and StorageTek and start-ups Diligent and Sepaton.

Unlike Virtual tape systems from IBM and StorageTek which are software-based, Bus-Tech's implementation is as an appliance that supports Enterprise System Connection (ESCON) attachments to the mainframe and Gigabit Ethernet, Fibre Channel or Ultra SCSI attachments to storage devices. It is similar to Quantum's and Sepaton's devices, except that it does not have any storage capacity.

Bus-Tech's Mainframe Appliance for Storage lets mainframe data be backed up to open systems storage such as EMC Symmetrix DMX or IBM's Enterprise Storage Server. It connects to the mainframe via ESCON or Fibre Connection and then to the storage device, effectively emulating as many as 64 IBM tape drives.

The Mainframe Appliance looks to the mainframe like an IBM 3840 tape drive. It stores and retrieves data from the EMC Centera and can reduce the floor space required for tape drives and cartridge storage. It also can reduce staff costs associated with managing a large tape library and reduce or eliminate the overall number of tape cartridges needed to support those applications.

Traditionally, users have thought

of virtual tape as a mainframe implementation. IBM and StorageTek have dominated the market with StorageTek owning 62% of the market and IBM garnering 38% in 2003, according to Gartner.

Tape emulation though has made it to open systems, where it is used with Solaris, Windows and Linux hosts. Diligent has an open-systems-based VTF Open, which runs on a Linux server and works with back-up software from Computer Associates, Legato Systems, Tivoli and Veritas Software, among others. Sepaton has its S2100 Virtual Tape Library System, an appliance that offers from 6T to 200T bytes of storage.

Raul Diaz, director of IT for Beyond Genomics in Waltham, Mass., uses Sepaton's appliance to back up 9T bytes of data.

"It used to take us more than 48 hours to back up data," Diaz says. With the Sepaton appliance, Diaz now backs up data four to five times as fast.

EMC also has caught the wave of virtual tape. The company introduced the Clarion Disk Library last month, which the company says backs up data 30% to 60% faster than tape and recovers data 90% faster.

The Yankee Group estimates that the market for open systems virtual tape will increase from \$210 million in 2003 to \$720 million in 2007.

"Virtual tape is not a big market right now, but it will grow as people will continually look at options to deal with data retention, which will require better access to data than tape can sometimes provide," says Jamie Gruener, a senior analyst for Yankee.

The Bus-Tech Mainframe Appliance for Storage for EMC Centera starts at \$34,000. ■



Storage

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Dell pumps up PDA with Bluetooth support

■ BY TOM KRAZIT

Dell last week unveiled three Axim PDAs, adding the Bluetooth short-range wireless network technology to its PDAs for the first time.

The Axim X30 models are also Dell's first PDAs to use Intel's new XScale processors. Four PXA270 processors were released in April, featuring clock speeds from 312MHz to 624MHz, and improved security and multimedia features. PalmOne's new Zire 72 was launched in April with the 312-MHz chip.

Dell also provides nonwireless and wireless versions of the X30. The two wireless configurations come with support for 802.11b Wi-Fi networks and Bluetooth.

Bluetooth is designed as a cable-replacement technology for peripheral devices, says Gervaise Nix, product marketing manager for Axim. Several customers in Europe also use Bluetooth PDAs to connect to Bluetooth cell phones to synchronize data and connect to the Internet over the cell phone's modem.

Dell next month will introduce several peripherals such as a Bluetooth keyboard and a global positioning system kit to use with the Axim X30, Nix says.

The X30 has the same dimensions as the X3, a slimmed-down version of Dell's X5 PDA, Nix says. The X30 measures 122.4 mm high by 77.2 mm wide by 14.9 mm thick and weighs 139 grams. It comes with a 3.5-inch display and a Secure Digital I/O slot.

The Axim X30 costs \$199 without any wireless technology. That version comes with a 312MHz PXA270 processor, 32M bytes of synchronous dynamic RAM (SDRAM) and 32M bytes of Intel's StrataFlash ROM.

A unit with 802.11b, Bluetooth, the 312MHz PXA270 processor, 64M bytes of SDRAM and 64M bytes of ROM costs \$249 after a \$30 rebate. The same unit with the 624-MHz processor costs \$349.

Krazit is a correspondent with the IDG News Service's Boston bureau.

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TOLLY ON
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Linux creeps into the enterprise

is at the core.

While there are a plethora of security services (such as Check Point's firewall) that run Windows 2000 as a base, my unscientific survey of appliances that have come through our doors in the past year seem to be more and more based on Linux. (Microsoft has made a concerted effort to make inroads in the realm of embedded systems, but that is a whole other story.)

More visible will be the emergence of Linux-based servers and desktops that interact with existing MS-based systems on your corporate network.

While you can't expect to find highly Microsoft-centric implementations like .Net Framework running on a Linux-based Apache Web server, you'll have no problem getting "vanilla" functions such as Web servers and Simple Mail Transfer Protocol (e-mail) Linux systems with which your corporate users can interact.

And even for desktop users, Linux has

come a long way in the past year. Out of the box, Red Hat Linux 9.0 installed easily on several systems we experimented with. While the load-time messages can be a bit unnerving for non-technical users, they safely can be ignored (in most instances) and users can interact with the GUI.

A key Linux-Microsoft integration component is SAMBA, an implementation of SMB-CIFS, aka Microsoft's LAN file system. Packaged with the Red Hat distribution, it is not installed automatically and requires more administration than on a Microsoft machine. But once installed, it lets Linux users access Microsoft shares and lets Linux machines function as Microsoft-compatible servers.

For those times when you simply must execute on a Microsoft machine, there is always Citrix Systems. While not included with the Red Hat distribution, it took but a few clicks on the Mozilla browser to download and install the Citrix Linux ICA client.

A few minutes later, I was running Microsoft Access "native" through the Citrix window.

Finally, the license structure of open source is serving as a catalyst for innovation in the enterprise — especially when it comes to multifunction security for small to midsize businesses (SMB). A current project with Astaro provides a textbook example.

Recognizing that SMBs: 1) need security as much as anyone; 2) rarely need the high-end features of "point products," and; 3) are very cost-conscious, the company has bundled a slew of "open source" firewall, VPN, anti-spam, etc., functions that provide integration of the aforementioned as its key value-add.

So note to self — begin learning Linux!

Tolly is president of The Tolly Group, a strategic consulting and independent testing company in Boca Raton, Fla. He can be reached at ktolly@tolly.com.

Blades

continued from page 21

but does so using a mezzanine board or host bus adapter.

IBM is integrating the actual switch into BladeCenter, thus reducing cabling requirements and letting users seamlessly connect their blades into Brocade- and Cisco-based networks. The switches fit into the back of the BladeCenter chassis and offer their suite of management capabilities. Analysts say IBM is the first to focus on integrating third-party switches into its blade offerings, though they note HP and IBM have integrated Nortel-based switches into their blade chassis.

"Without these integrated modules you'd have to take the vendor's own [switch], which then wouldn't integrate nearly as well with your overall infrastructure and, therefore, the blades would tend to be an island off to the side. Or you would have to use the Brocade or the Cisco switches as external components. And then you lose some of the integrated nature of the blade," says Gordon Haff, an analyst at Illuminata. "By integrating the switches, it lets you stay within the integrated blade environment while at the same time staying within your existing switch infrastructure."

That's a capability that users say will let them do more with the blade systems.

Harry Williams, director of technology and systems at Marist College in Poughkeepsie, N.Y., has used IBM blade servers for about a year to run distance-learning applications. He says the integrated Cisco switch will reduce management headaches and let him expand his use of the blades.

"[The Cisco switch module] takes up less room in our rack, and it more tightly integrates with all of our other network management tools. And there's less cabling, fewer things to break and fewer things to

buy," he says. "We're going to look at how this can drive new projects. We're starting to consider more grid projects, and we're looking at BladeCenter as being a key component of that."

With IBM and Cisco integrating their products, his staff no longer has to focus on making sure the technologies work well together, Williams says.

"And I don't get the finger-pointing between vendors," he says. "They're telling me these things are going to work together before they even arrive at my shop."

Across the board, systems vendors say they will continue to look at ways to better integrate blades into storage and network architectures.

Tejas Vakil, vice president of marketing at RLX Technologies, for example, says that while his firm's management software, called Control Tower, is the key to integrating the blades into the overall

"We're starting to consider more grid projects, and we're looking at BladeCenter as being a key component of that."

Harry Williams

Director of technology and systems, Marist College

data center infrastructure, he doesn't rule out integrating third-party switches into the blade chassis as IBM has done. HP also says that it plans blade fabric switch announcements.

But analysts say blades still face some hurdles when it comes to widespread adoption. For one thing, the blades are still about the same price as comparable 1U servers and must be bought with a blade chassis. Users say that buying multiple blades is where real savings come in.

Vendors must continue to work to better integrate the blades into the data center,

analysts say.

"[Symmetric multi-processing] blades are a big strength. So are multi-platform, multi-operating system blade offerings. Customers don't want to just consolidate one architecture or operating system onto blades, they are looking at consolidating multi-

ple operating systems into the blade form factor," says Sarang Ghatpande, lead analyst for industry-standard computing platforms at D.H. Brown. "There is a lot of interest in RISC/UNIX, [Intel Itanium] and Opteron-based blade products [running together] in a single chassis, and vendors addressing this would have a much stronger value proposition than someone selling only a single type of blade product within a chassis."

Another issue is the lack of standardization among blades and the inability to combine blades from different vendors. ■

IBM, Cisco partner on IP services, products

■ BY LAURA ROHDE

IBM and Cisco last week announced that they agreed to jointly develop and sell IP telephony systems.

As part of the agreement, Cisco's voice, video and conference products will be coupled with IBM's Global Services offerings, the companies said in a statement.

Along with selling the IP products and services through its Global Services contracts, IBM and Cisco also will offer the new and current products to independent software vendors and service providers that want to serve as channel partners, the companies said.

The current Cisco products include its

CallManager call-processing software, CallManager Express, its communication services Unity and Unity Express, MeetingPlace, Personal Assistant and its IP Contact Center. Those products will be integrated with IBM products such as Lotus Domino unified communications, IBM's Information Management database software and Tivoli systems management certification.

IBM will offer support for Cisco CallManager on its eServer xSeries x345 and x306 server platforms, and on two new Cisco media convergence servers, the MCS 7815I and the MCS 7825I, based on IBM technology, the companies said.

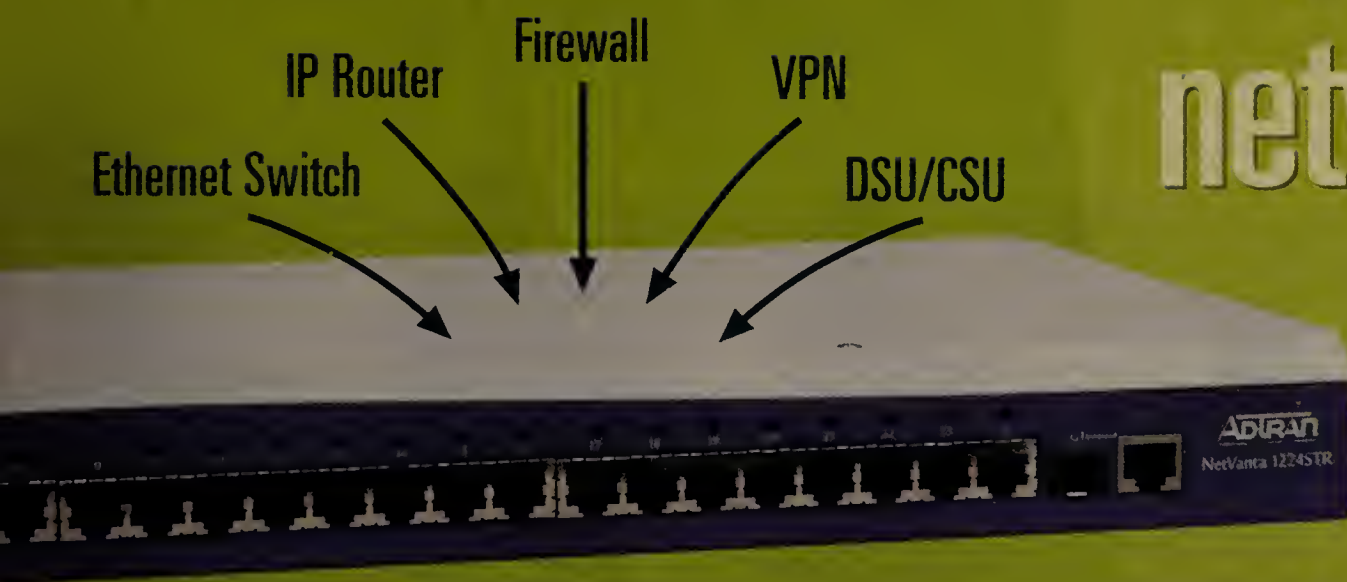
The agreement, for which financial details were not disclosed, builds on an

existing relationship between the two companies. IBM has implemented 20,000 Cisco IP telephones since first installing its IP telephony at IBM's Toronto software laboratory in 2001, the companies said.

Earlier this year, Cisco and IBM began a collaboration on security, letting customers authenticate IBM-based laptop and PC clients on Cisco-based LAN and remote-access infrastructures. As part of that effort, the companies integrated security management products such as IBM Tivoli's Identity Manager with Cisco's Access Control Server.

Rohde is a correspondent with the IDG News Service's London bureau.

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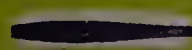


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Short Takes

■ **Microsoft** is teaming with systems integration and consulting firm **BearingPoint** to deliver a set of software and services packages aimed at national and local governments worldwide. The companies last week said they plan to develop packages in the areas of program management, electronic-document filing, e-government, Web services, national security, public pension administration and independent software vendor bundles based on Microsoft's enterprise software. The partnership is not Microsoft's first with BearingPoint. The companies already rolled out eFiling for Courts in March that helps courts implement electronic filing systems, and have worked on putting together packages for state governments in areas such as transportation and online retirement services. Many of the new packages are scheduled to be available in the next six to seven months. Pricing will vary according to the government and scope of the contract, Microsoft said.

■ **IBM** last week said it is partnering with four companies that make **XML security products** so that their products will work easily with IBM's Tivoli Access Manager management software. The partnerships, with **Digital Evolution, Layer7, Reactivity** and **Vordel** will simplify security management, letting administrators manage and enforce security policies for XML firewalls using **Access Manager** and help companies that are deploying a service-oriented architecture. SOA is a way to build an interactive and extensible set of software services between customers, partners and suppliers, IBM said. **Digital Evolution's Service Manager XML** and Web services management and security product, **Reactivity's XML Firewalls**, **Vordel's Vordel-Secure XML gateway** and **VordelDirector** XML security server and **Layer7's SecureSpan** product all will integrate with Access Manager, IBM said.

In Site: Lessons from leading users

Wells Fargo unifies portal infrastructure

■ BY ANN BEDNARZ

The wholesale banking division of Wells Fargo had so much success with its customer-focused Internet efforts, it decided to replicate the infrastructure internally.

"We realized we should be doing for ourselves what we're doing for our customers," says Danny Peltz, executive vice president of wholesale Internet solutions at Wells Fargo.

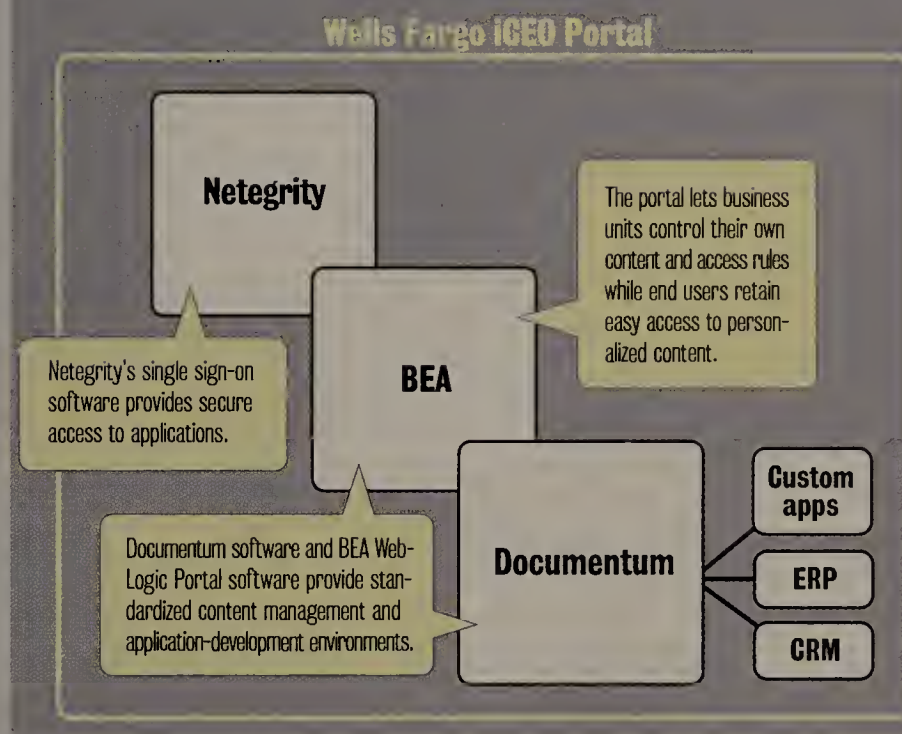
The San Francisco bank employs 144,000 people and handles about \$400 billion in assets. Its wholesale banking division includes asset-based lending, capital markets and commercial banking, for example, and accounts for about 20% of the bank's \$6 billion net income, according to Peltz. His group develops Web-based services for customers and employees involved in the bank's wholesale business.

Last year, the division decided to clean up its internal systems architecture. The main issue was a proliferation of Web applications and portals put up by different departments, often to expose one

See Wells Fargo, page 30

Portal rationalization

Looking to reduce the proliferation of Web applications and departmental portals, Wells Fargo created a master portal called the internal commercial electronic office (iCEO) that would let the company's multiple portals and users more easily draw on shared corporate resources.



Start-up adds smarts to Web services

■ BY JOHN FONTANA

Start-up Infravio plans to introduce a Web services registry next month that will let companies and their partners more easily locate and use Web services, control access to those services and track usage.

The company's X-Registry is an asset management repository that lets companies catalog Web services and make them available to various end users as part of a service-oriented architecture (SOA). The registry plays on an idea that was originally a cornerstone for Web services — Universal, Description, Discovery, Integration (UDDI). The UDDI model created a sort of Yellow Pages for advertising and locating Web services.

Infravio intends to improve on UDDI by expanding who can extract data from the registry and by adding an application that

runs against the registry. It also provides views of Web services based on user roles and services for authorization, provisioning, support and management. The registry also integrates with two other Infravio tools: X-Broker, for delivery management and security; and X-Console, for monitoring, logging and alerts that integrates with NetIQ's Application Manager console.

"Infravio is trying to do more than UDDI with a registry that allows you to consolidate Web services metadata into a master registry," says James Kobielus, an analyst with Burton Group.

X-Registry consolidates data from UDDI and Electronic Business XML repositories and makes available technical data about the services, such as what formats it uses, and business information, such as service-level agreements and the cost for using the service. Infravio plans to develop a federat-

ed registry model, to let X-Registry pull information from other registries in real time.

Infravio is trying to carve out a niche among the crowded field of companies, including HP and Computer Associates, which provide Web services management tools. Other players include Actional, Amberpoint, Blue Titan, Digital Evolution, Flamenco, Systinet and Westbridge.

The registry also supports Infravio's Delivery Contract Model, which stipulates how a Web service is delivered, what level of security is needed, what data needs to be transformed, and what version and quality-of-service model is used. The delivery contracts are enforced through Infravio's X-broker.

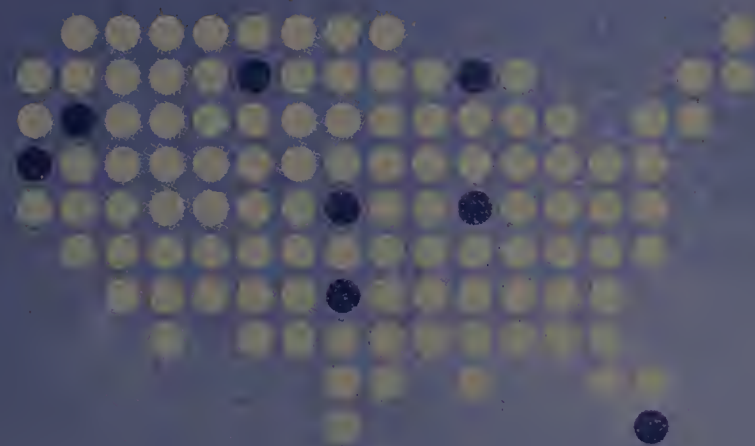
The X-Registry has an administration console to create users, manage access controls and user roles and configure delivery contract terms. Pricing starts at \$35,000. ■



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Site: Lessons from leading users

Well Fargo

continued from page 27

function or data source, without any reference to an overall enterprise architecture.

The wholesale banking division set out to create a master portal framework that would let multiple applications draw on shared resources — such as access and authentication services — and minimize duplicative development and maintenance efforts. Peltz also wanted to establish a common interface to key customer and employee applications.

To accomplish this, commercial banking division decided to pare back the number of applications it was running and build a common infrastructure platform with BEA Systems' WebLogic Portal 8.1 software, Documentum content management software and a customized version of Netegrity's single sign-on software. The division hatched its plan last summer and deployed a pilot project in December. Today, the portal-based framework is up and running, and content- and application-rationalization work continues.

The wholesale banking division modeled its internal overhaul on its commercial electronic office (CEO) portal, which launched in 2000. CEO is for external users: About 75,000 users from more than 17,000 corporate Wells Fargo clients use CEO and its 35-plus applications and services to view account information and execute money transfers, for example.

Promoting growth

Peltz mirrored the CEO setup because of its success: The financial services portal processed almost \$6 trillion in electronic payments in 2003 and yielded a 54% gain in revenue growth through the Internet vs. 2002 figures, Peltz says.

A key attribute of CEO is that it uses common infrastructure services while letting different departments maintain control of certain distributed processes, Peltz says. "If you try to fit everybody into a single framework, it's just not going to work," he says. "You want to have a common framework, but you want to be able to distribute out control as much as possible. Nobody wants to be told what to do. They want to be able to drive their business as they see fit."

At the same time, the use of common infrastructure services frees departments from dealing with technology issues such as security, single sign-on and content management.

Peltz applied the same philosophy in the design of the internal iteration of CEO, called iCEO, which provides single sign-on access to the divisions' applications. Before the launch of iCEO, the wholesale banking division had more than 500 applications, Peltz says. Now some of them can go away. "Our goal is to significantly rationalize those applications and render them within this iCEO portal framework," Peltz says.

In addition to reducing application maintenance burdens, iCEO will improve data quality. Peltz wants to consolidate data entry in the iCEO portal framework, and then push data to the multiple systems of record to ensure consistency and eliminate the need to continually re-key data.

Similarly, the portal will push specific content to employees based on their role in the wholesale banking division, and let them have control over the content to which they subscribe, Peltz says. "The mass blast of information just doesn't work," he says.

The process of moving content to a single content management system already is triggering some maintenance benefits: One business unit reduced the number of Web pages it maintained from 10,000 to 2,000 as it considered which content was useful and which was obsolete, Peltz says.

Down the road, Peltz plans to link the customer-facing and internal application infrastructures, which today are alike but disconnected. "CEO and iCEO are really built on the same platform, with the idea of connecting the two over time and utilizing technologies such as a [service-oriented architecture] and Web services so that we can build once and deploy to either one of the two segments," Peltz says. ■

Sygate's new devices batten down net endpoints

■ BY TIM GREENE

Sygate this week is announcing new hardware that can discover unauthorized devices on networks and check known devices periodically to ensure they are functioning and continue to comply with security policies.

Called Sygate Magellan, the new gear consists of Sygate Discovery Engine, which gathers data from devices on networks, and Sygate Correlator, which gathers, stores and analyzes the data that the Discovery Engine collects.

Discovery Engine ascertains any network-addressable devices, and Correlator can determine whether they meet corporate security policies. The data can be exported to asset management systems made by other vendors, overarching network management systems and vulnerability scanners.

With existing Sygate products Sygate Secure Enterprise (SSE) and Sygate On-Demand (formerly Sygate Security Portal), Magellan can protect networks from internal and external attacks by making sure computers meet security standards before being granted access to corporate networks. Sygate calls its security system Continuous Protection.

The Sygate line lets companies protect corporate networks from potentially infected machines

that are connected to the LAN and that are accessing the network via VPNs or Secure Sockets Layer (SSL) remote access, says Chris Christiansen, an IDC analyst.

Continuous Protection will compete with security-compliance gear from Internet Security Systems, InfoExpress and Preventsys, and individual security vendors such as Check Point that are adding some similar features to their products, Christiansen says. Security services from iPass and GoRemote Internet Communications also will compete, he says.

For the system to work, end devices need Sygate Security Agent software that probes whether the host machine is configured properly and reports back to SSE and to Magellan devices. SSE then can deny access and refer the machine to servers where they can get software updates to bring them into compliance with corporate policies using the Layer 2 authentication standard 802.11x. Support for 802.1x is new with the latest SSE Version 4.0.

The new software also adds support for Trusted Computing Group chips that store security keys, passwords and certificates on many IBM and HP computers and servers.

Sygate On-Demand is software that can scan and enforce poli-

cies on devices that access corporate networks via SSL remote access but that are not owned by the corporation.

These On-Demand software agents ensure security by creating virtual desktops on these devices that are purged when the remote session ends so subsequent users can't access data retrieved during the session.

The new software also includes an application programming interface that partners can include in their SSL gateway products to enforce Sygate-controlled policies.

The latest version of On-Demand adds support for custom rules and creation of rule groups that can check for applications, operating system configuration and patches on remote machines.

SSE Version 4.0, On-Demand 2.0 and Magellan are scheduled to be available next month.

Pricing for SSE starts at \$70 per machine and for On-Demand at \$40 per seat. One of each Magellan 1.0 appliances plus a management GUI costs \$80,000. ■



Core Security unwraps security-test tool

■ BY ELLEN MESSMER

Core Security Technologies this week updated Core Impact, its security penetration-test tool for desktops and servers that lets customers run a series of exploits to determine how far into corporate resources a hacker could burrow.

Version 4.0, which runs on Windows 2000, XP, Linux, Solaris and OpenBSD, presents a set of exploits that authorized managers can run that duplicate hacker capabilities. This version eliminates the need to manually direct each testing step and automates the cleanup procedure of removing files and back doors that get installed as a routine part of changing machine configuration. The tool can import information

about network vulnerabilities that are discovered by commercial tools such as Internet Security Systems' Scanner and freeware like Nessus. It competes with freeware such as the Metasploit Project tools for penetration testing and is viewed as complementary to vulnerability assessment tools, which can identify network holes by scanning.

James Cupps, chief information security officer at global paper manufacturer Sappi, says he has used Core Impact for a number of years to supplement vulnerability-assessment tools, which cover a wide range of possible network and application holes but often generate false positives.

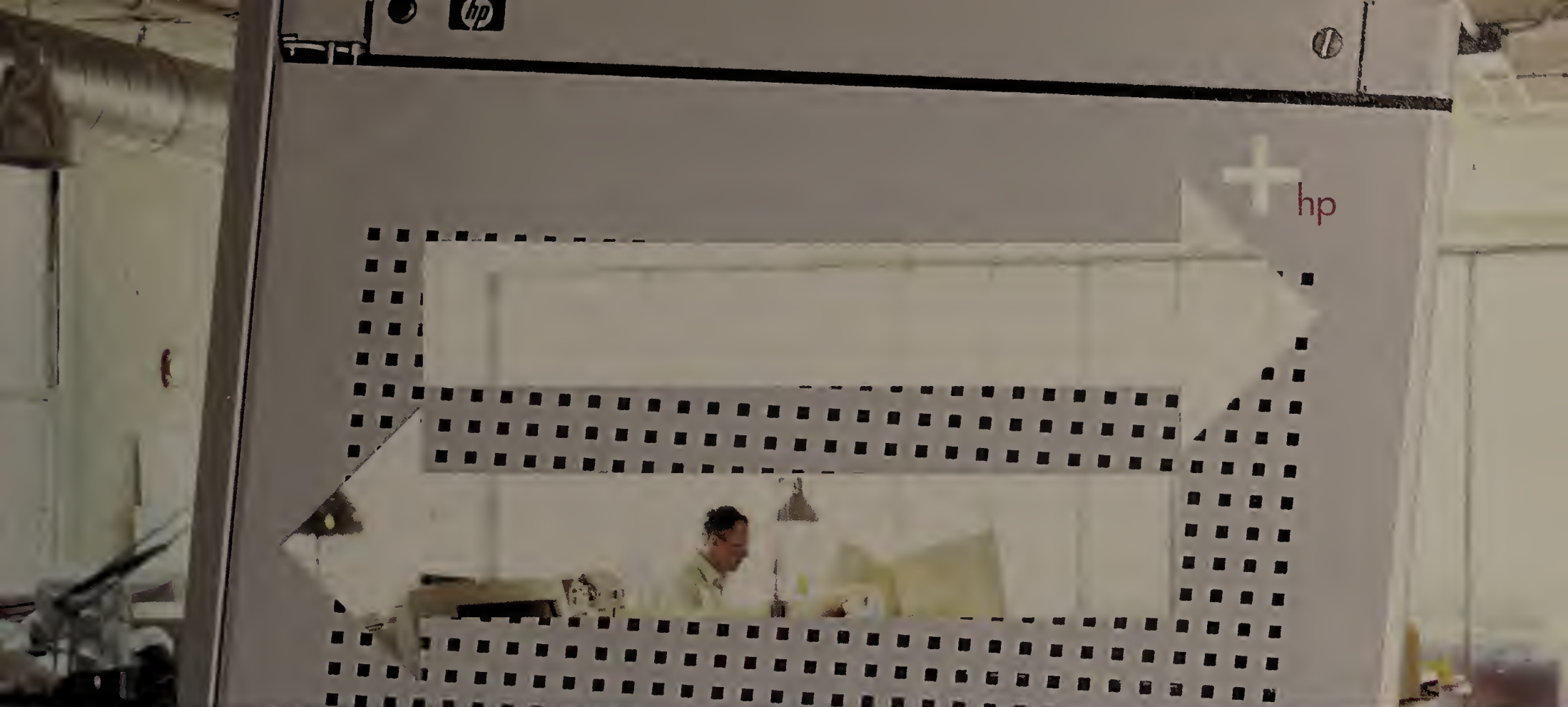
"Core Impact is more accurate if not more comprehensive than vulnerability assessment," Cupps

says. For instance, Nessus might identify a few thousand possible weaknesses, but Core Impact zeros in on the 100 or so most critical exploits.

When vulnerability-assessment tools pick up a weaknesses in any of Sappi's 2,000 desktops or 600 servers, Cupps checks the results with Core Impact to make sure there are no false positives and to determine how deeply hackers might exploit a problem. "I'll do this on a quarterly basis, once a week for each subnet, and give the results to a systems administrator," Cupps says.

Core Impact consolidates reporting on network exploits and presents them on a PC-based management console.

Core Impact 4.0 starts at \$2,500 for an eight-server license. ■



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UFOs and flying penguins

The Mexican Air Force reported in the middle of the month that one of its pilots had encountered what might have been UFOs a month earlier while flying a drug surveillance flight. They even

released a film showing some bouncing blobs of light. UFO fans immediately touted the report and film because it was the first time a major government had formally released such a film.

A few days later, in what I assume was a coincidence, the Alexis de Tocqueville Institution released the latest in its long-running string of anti-open source "reports." (I use quotes around the word "reports" because not everyone would agree that these screeds rise to the level of logic that would be required by even a high school teacher to qualify as reports.)

I've written before about the institution's views on open source (see "Fighting terrorism with obscurity," see www.nwfusion.com, DocFinder: 2130). I'm still not quite sure why the group has such a burr under its saddle about this topic, because its mission, according to its Web site, is to study "the spread and perfection of democracy around the world." About half the topics listed on the home page seem to be related to democracy, or at least mention the term. But it seems a stretch to say that stories about how Linux will collapse because of software patents (www.adti.net/penguin.html), how governments can save money using IP telephony (www.adti.net/voippressrelease.htm), or how outsourcing (and open source) will destroy the value of companies (www.adti.net/outop.htm) relate to the spread of democracy.

That said, I don't think it's a bad idea for people to look at these issues, whatever the cover they want to use to do so. But I do think it's a bad idea to publish what looks like a paint-by-number portrait of the evils of something that it is not clear you understand, and to do so without offering any specific recommendations of alternatives.

It is not clear who prints the patterns that the Alexis de Tocqueville Institution so carefully tries to color within the lines. Microsoft admits to funding the institution, but, as I noted the last time I wrote about the group, it's hard to believe Microsoft would hire people who drew such crude lines to fill in. There are real issues hiding in here somewhere. It is sad that the institution does not do a better job of exploring anything but the anti-open source side.

I suppose that the open source/Linux community should take the institution's attention as a positive thing. I doubt the group would make the effort if no one were using this software. This Penguin (as the institution calls Linux) is flying high enough and fast enough that maybe the institution mistook it for a UFO. News reports now say that maybe the Mexican pilots just saw ball lightning and not some manifestation of otherworldly intelligence. At least for now, we might have to rely on the Alexis de Tocqueville Institution for that.

Disclaimer: The Harvard Divinity School, by its mission, cannot be restricted to worldly thinking; such restrictions are optional at the other schools. But the dismissal of such efforts in this column is mine alone.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sob.com.



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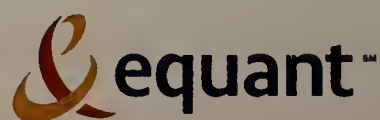
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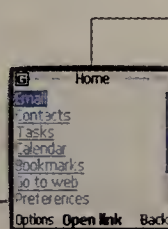
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Special Focus

APPLICATIONS: A look at Citrix.

Citrix shifts gears; users wary

■ BY JOHN COX

Citrix Systems customers are welcoming the most recent release of the company's software products, but generally not for the reasons Citrix executives would like.

The company has been working to create a new market for its flagship MetaFrame Presentation Server, a program that displays applications on an array of computing devices while the applications run on server farms under Windows Terminal Services. Presentation Server is now one part of a package of four separate products, called the MetaFrame Access Suite. The idea is to use the suite to create a set of client/server programs that let end users connect to their applications from any device, over any network. Citrix calls this an "access management infrastructure."

Last fall, Citrix launched a \$14 million advertising campaign to promote its new message. In April, it shipped the latest release, 3.0, of both its core Presentation Server and the Access Suite, which also includes applications for working collaboratively on documents and applications, a secure Web portal and a single sign-on capability.

The user view

But judging from some customers' comments, systems integrators and analysts, Citrix is going to have to spend a lot more to get that message to sink in. For these people, Release 3.0 is simply a way to improve traditional Citrix deployments.

"We're finalizing our testing on the new features in [Presentation Server] 3.0, and we're very excited by the performance improvements and other enhancements," says long-time Citrix customer J.B. Dunn, manager of desktop technology for Roadway Express, a transportation services company in Akron, Ohio.

“Citrix desperately wants to move beyond being a ‘one-trick pony.’”

Brian Madden

Independent technology analyst

Several enhancements promise to boost MetaFrame's performance with multimedia and Web content over wide-area links, a critical issue for this company that has more than 6,000 users, most on thin-client Wyse Windows terminals, in nearly 400 offices. The terminals access a suite of PC applications loaded on a MetaFrame-controlled server farm running Windows 2000 Server. "This is critically important to us," Dunn says. "We serve everything over the WAN. We have to have performance that can run our business."

The original reasons for this deployment are familiar: centralize desktop applications on servers to reduce support costs, and improve performance

Moving on

Citrix may be trying to focus beyond server-based application delivery to the desktop, but the company has a number of challenges to achieving its goals.

Strategies:

- Create customer demand for server software to manage client access to applications.
- Focus on its biggest accounts in the Fortune 500.
- Refocus and equip channel partners for "access management" message.

Challenges:

- Customers typically buy Citrix for desktop replacement and server-based computing cost savings.
- Traditional customer relationships are at lower levels of enterprise IT groups.
- Software suite is four separate programs, only partially integrated at this stage.

over the WAN when accessing Unix and mainframe line-of-business applications. These kinds of benefits have let Citrix build a \$600-million-per-year business, counting among its client list most of the Fortune 500. These benefits are still the main drivers for many Citrix customers. The "access management infrastructure" for now is an idea whose time has not come.

"We want to understand more fully the evolution of the products they're bringing to market and understand how they fit into our plans for this computing model," Dunn says.

One-trick pony?

"Citrix desperately wants to move beyond being a 'one-trick pony,'" says Brian Madden, an independent technology analyst who's written three books on Citrix and server-based computing. His Web site, www.brianmadden.com, is a hive of Citrix news and rumors on Citrix and server-based computing.

"Their solution is that 'We supply the infrastructure for your users to access applications,'" Madden says. "This is not something customers were asking for."

Citrix integrators say they are incorporating the concept of access management into their traditional focus on lowering IT costs. "I think it's understandable and totally logical to have an access infrastructure story and strategy," says Marc Mangus, national director of technology, for Vector ESP, a leading Citrix integrator in Houston. "But there's a lot of [customer] education involved. And Citrix knows this."

Vector typically emphasizes the cost savings that Citrix can realize for big companies. One Vector customer is ABM Industries, a \$2.1 billion facilities man-

agement service. ABM replaced 70% of 4,000 PCs with thin clients, hosting its new J.D. Edwards' ERP software on a server farm running MetaFrame Presentation Server. ABM CTO Anthony Lackey has said his company saved at least \$10 million in five years as a result, not counting so-called soft savings in higher employee productivity and reduced downtime.

"Today, we say to a CIO, 'We're going to show you how to drive costs out of IT using an access infrastructure,'" Mangus says. "It dovetails nicely with what Citrix is telling customers."

Wireless is the key

But the best example of Citrix's access message might be found in the issues related to deploying applications over the next-generation of high-performance cellular networks.

Mobile and remote users have to connect over various types of wireless networks. Somehow they have to have technical support for the different types of end-user devices, applications and operating systems they use. And immediate access to line-of-business applications and corporate data can pay huge dividends.

Cellular networks are expanding in breadth and bandwidth, with expansion of Code Division Multiple Access, CDMA 2000 1x-EVDO and GSM, says Paul Giobbi, president of Zumasys, a Citrix integrator in Lake Forest, Calif., that specializes in wireless applications for small and midsize businesses. Rates are about \$80 per month for unlimited data, he says, and he expects that to drop in coming months to \$50.

At the same time, Citrix is optimized for low-bandwidth connections, needing only 20K bit/sec for a good performance, the company says. In the new release, Citrix has added clever techniques to create a smooth, fast user interaction even when cellular signals are weak. An auto-reconnect feature lets a user keep working until a new connection is forged and the application can "catch up."

"To the user, the connection seems flawless. It's pretty compelling," Giobbi says.

One Zumasys user is Continental Lab Products (CLP), a San Diego supplier of lab equipment and supplies to life sciences companies. It deployed MetaFrame Presentation Server at headquarters and the Citrix client on laptops issued to its sales representatives, giving them for the first time direct, wireless access to CLP's ERP system, Microsoft Outlook and a centralized lead generation and contacts database, says Paul Cranford, a CLP vice president.

Data accuracy has improved, support calls are fewer because the laptops now have a single, and simpler, configuration. In March, also via MetaFrame, CLP began making order and shipment confirmations available to sales representatives, who can access the data from a customer site and show customers their order status. Eventually, CLP will set up Web-based access via the Citrix products.

"Our sales reps know they can get any customer information on demand," Cranford says. ■

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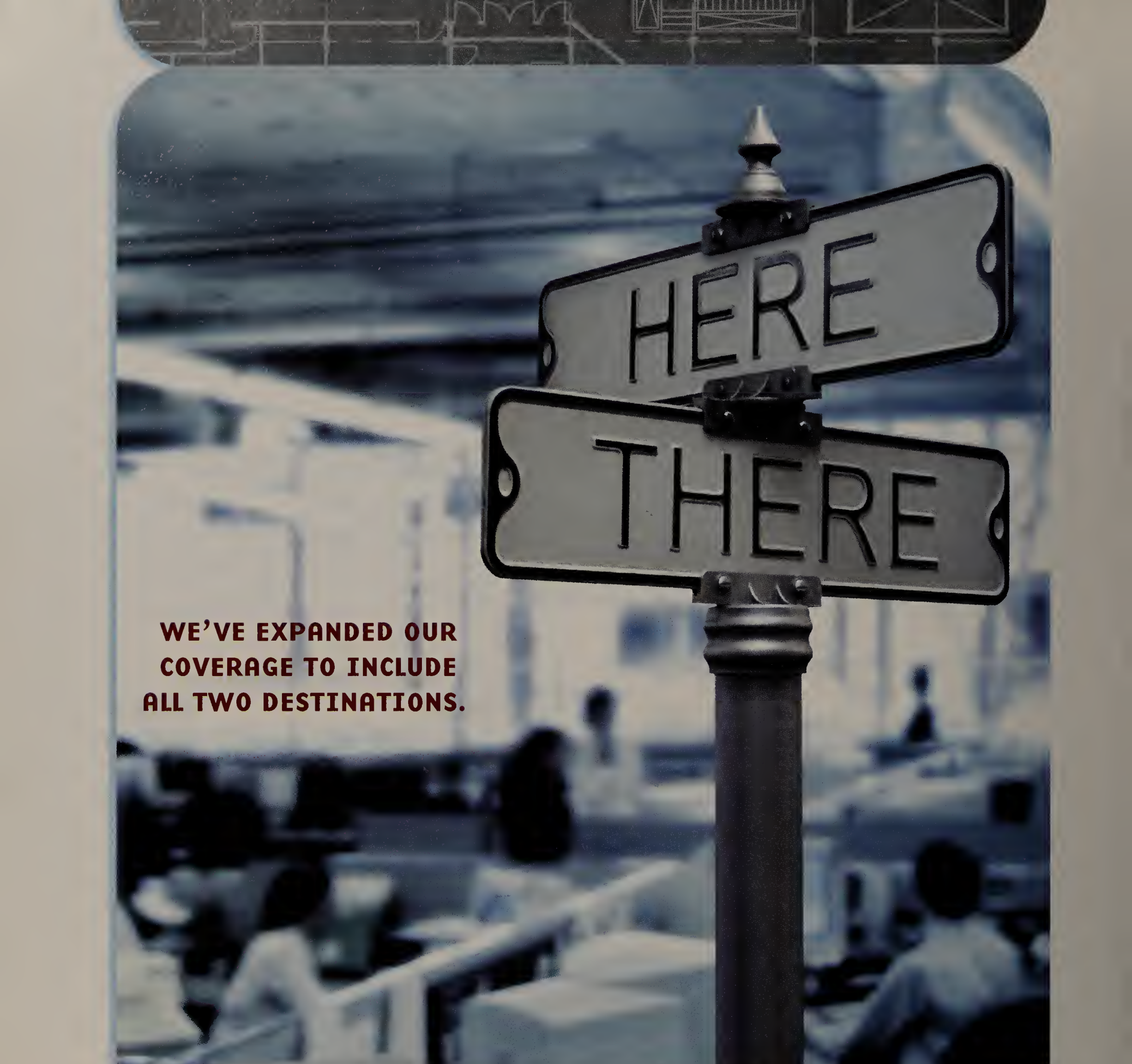
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Performance means many things for ISPs

■ BY CAROLYN DUFFY MARSAN

When it comes to IP network performance, service providers agree that there are three key metrics: availability, latency and packet loss. For corporate buyers, the good news is that top-tier ISPs are guaranteeing better performance on all three measurements in their service-level agreements.

"We review the numbers we guarantee in our SLAs once a year to ensure that they're current," says Kevin Phillips, director of packet operations for Sprint. "Take packet loss. If we've met our objectives for the whole year and it looks like we could do better... we will pass that along to our customers in terms of more aggressive goals."

ISPs use many metrics to track their IP networks, and these metrics can be confusing to buyers of Internet services. In the first



part of this two-part series, we looked at various statistics ISPs use to measure the size and reach of their IP networks. In this part, we'll look at the network performance statistics that are used most commonly in corporate SLAs.

Most ISPs outperform the statistics that they promise in their SLAs. For example, Sprint promised 99.8% network availability in its SLAs in 2003, but the carrier says its actual availability averaged closer to 99.999% at the core of its network.

"We're pretty good at protecting customers from core network problems," Phillips says.

"It's the last mile that often causes customers problems."

It's obvious why network availability matters. ISPs can talk about the amount of bandwidth they have or the reach of their

See ISPs, page 40

Vendors angle for edge in multiservice market

Hammerhead and Alcatel add to recent product flurry.

■ BY JIM DUFFY

An established vendor and start-up each unveiled multiservice routing and switching products and enhancements last week for a market that has become white hot.

Start-up Hammerhead Systems introduced an edge switch that is designed to migrate service providers from legacy Layer 2 services, such as ATM and frame relay, to newer Layer 2 and Layer 3 services, such as Ethernet and Multi-protocol Label Switching (MPLS) VPNs.

Meanwhile, Alcatel rolled out hardware and software enhancements to its 7670 Routing Switch Platform (RSP) intended to add support for Ethernet and boost service performance and flexibility.

The Alcatel and Hammerhead offerings are the latest in a flurry of multiservice edge announcements from incumbent vendors and start-ups. Two weeks ago, Nortel unveiled its latest edge product, the MPE 9000 multiservice router; Lucent is expected to roll out the next-generation CBX 3500 next month; and Cisco, Juniper

and Laurel Networks have all added or enhanced multiservice edge routers in the past few months.

Also, Ciena acquired Layer 2 multiservice edge switch start-up WaveSmith Networks a year ago after WaveSmith landed a DSL aggregation deal with SBC.

But Hammerhead's HSX 6000, which compares most closely with WaveSmith's 2-year-old DN switches, might present a twist to the plot. The switch includes two features analysts say are differentiators in the multiservice edge arena.

The first is called bandwidth pooling. This capability lets carriers free system capacity from underutilized forwarding cards. They can add processing resources and capacity to other physical interfaces or services on an as-needed basis, Hammerhead says.

Another innovation is a dual control plane with "bridge and roll" capabilities. The HSX 6000 supports ATM and MPLS control planes — instead of one or the other — and carriers can execute a "graceful cutover" of circuits from legacy ATM cores to MPLS backbones, or bridge and roll.

"This design is definitely unique from other next-generation Layer 2 switches that we've seen," says Mark Bieberich, an analyst at The Yankee Group.

Hammerhead benefits "a little bit from the fact that they are a couple years later," says Joe McGarvey, an analyst with Current Analysis. "They have a better read on what carriers want."

At the same time, though, Ciena's WaveSmith offering already is deployed by SBC and Verizon, McGarvey notes. Other challenges facing the small, unproven Hammerhead is lining up a partnership with a large, financially stable vendor already entrenched in carrier networks. Hammerhead is said to be partnering with Fujitsu in a non-exclusive arrangement, but observers say the company needs something tighter.

The HSX 6000 might attract such an arrangement. In addition to the pooling and bridge and roll features, the switch scales from 30G to 120G bit/sec full duplex, while squeezing into one-quarter of a telco equipment rack.

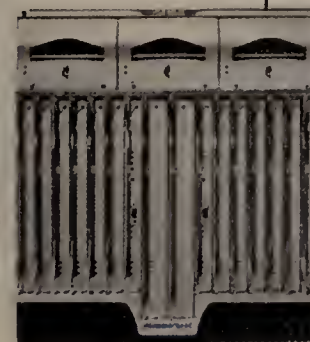
Interface support ranges from E1 to OC-192c/10G bit/sec Ethernet.

See Multiservice, page 41

At your multiservice

Features of Hammerhead's HSX 6000 edge switch:

- Bandwidth pooling for making use of stranded system resources.
- Distributed Service Interworking Engine, for enabling introduction of new Ethernet-based services to existing frame relay and ATM revenue streams.
- Dual Control Plane with Bridge and Roll, for enabling interoperability between and migration from ATM to MPLS cores.



Start Takes

■ **The DSL Forum** last week released a document defining specifications for **asynchronous DSL** equipment and service interoperability. Called Technical Report-067, the document specifies ADSL bit-rate and distance requirements that reflect the recent improvements in ADSL modem performance, which are now capable of 3M bit/sec and higher speeds. TR-067 defines a consistent testing and reporting environment to help ensure reliable test results, the forum says. The DSL Forum was established in 1994 and has about 200 service provider and equipment manufacturer members.

■ As expected, remote-access service provider **Gric Communications** officially changed its name last week to **GoRemote Internet Communications**. The service provider also announced a new version of its client software, enhancements to its Mobile Office and Branch Office services, and a new service-level agreement for the latter service. The client has a new look and lets users display it as a toolbar anywhere on their screens. The client presents all connectivity options, automatically detects VPN software running on a laptop and incorporates that client information into the user's profile. Mobile Office users now can connect to the Internet via general packet radio service mobile networks in addition to DSL, dial-up and Wi-Fi services. Branch Office VPN customers now have a tool available that displays real-time network performance information and a new SLA. The service provider's 24-page SLA lays out 12 guarantees ranging from end-to-end network availability to jitter to on-time installations.

ISPs

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networks, but what really matters is whether the network is up and available.

Top-tier ISPs promise anywhere from 99.5% to 99.99% backbone availability in SLAs, according to Forrester Research. This number is an average over the course of a month and doesn't cover the end user's site availability unless the customer is buying an end-to-end managed service.

"Availability shows: Is the network up or is it down? Do you have access to it? That's a number that we [guarantee] in our SLAs, and the customer can measure," says Fred Briggs, president of operations and technology at MCI.

Brownlee Thomas, a principal analyst with Forrester, recommends paying close attention to the availability guarantees in SLAs. Customers typically must have an outage that lasts for a certain period of time — such as an hour — before remedies kick in. Some SLAs do not cover a situation where you have several 59-minute outages in a given 30-day period.

"I always ask for a cumulative report of any outages that lasted more than 10 or 15 minutes over a 30-day period," Thomas says. "The key is to have a remediation plan so that if I have cumulative outages ... we will have a verbal conversation to see what [the ISP] is doing about it."

Another key metric is packet loss, which is an indicator of network congestion. Packet loss measures the number of packets that were unsuccessfully transmitted and had to be resent. SLAs might promise 0.2% or 0.3% packet loss, but the perfor-

mance that many ISPs actually see on their networks is closer to 0.03% or 0.04%.

"We guaranteed 0.3% for 2003, but we've improved that to 0.1% for 2004," Phillips says. "What customers see could differ depending on geography."

A third key measure is latency, which shows the time delay that a customer will experience while a packet travels from its origin point to its destination and back. ISPs guarantee different latency numbers in the U.S. vs. other parts of the world because these statistics often depend on local access providers.

Typically, latency SLAs are about 45 millisecond to 65 millisecond in North America, according to Forrester. However, they can be double or triple that for trans-Atlantic or trans-Pacific traffic.

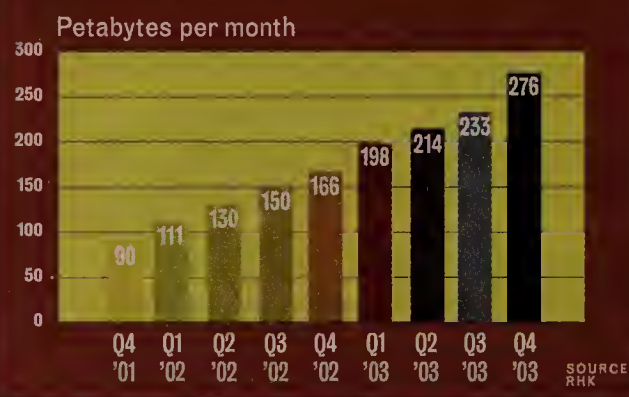
Thomas recommends buyers ask ISPs to provide latency statistics for the locations they need, not average numbers across the entire network. She recommends buyers ask ISPs to provide three to six months' worth of network performance data for five or 10 city pairs where they have major locations.

"Latency matters between my sites, not across the world. And it matters at my peak business times, not 365 days a year. It's really easy for the ISPs to make their SLAs," which are often based on overall network averages, Thomas adds.

Other performance metrics to consider are jitter and packet order, which are increasingly important for emerging applications such as voice and video over IP.

North American 'Net traffic continues to rise

ISPs have many metrics to describe how they're doing moving it.



Jitter is a metric that is designed to measure the quality of the IP connection. Another key metric for VoIP applications is called "out of order," which measures whether packets get across the Internet in the right order.

"You won't see anyone publishing stats on out of order, but it's actually more significant for VoIP than latency," says Craig Uthe, IP network product management director for AT&T. "What if the words I'm speaking came out of order? That affects you more than if the words took an extra second to get to you."

Also important are measurements ISPs use to track the quality of their customer service. Much as manufacturers measure defects per million parts, ISPs measure the meantime to respond to customer problems and the meantime to restore service.

"The mean time to respond is how

quickly I get back to you. It doesn't mean the problem is fixed," Thomas says. "The meantime to restore means you might be on backup. It's the meantime to repair that means it's fixed."

Sprint measures what it calls chronics and repeats, which occur when a customer has the same problem two or three times in the past 30 or 40 days. Sprint doesn't make promises in its SLAs about chronics and repeats, but the ISP is trying to be more proactive by addressing these kinds of problems in its trouble-ticketing system.

"I have thresholds set in my systems ... and alarms based on those thresholds," Phillips says. "We know

that a problem has happened, but the question is can we prevent it happening a fourth or fifth time. We need to get to the root cause."

While numbers that measure IP network performance and size are worth noting, corporate purchasing decisions are likely to emphasize softer issues such as available services, features and price.

Jack Pond, CIO for Montgomery County in Pennsylvania, recently replaced an aging FDDI network with a high-speed IP backbone to carry the county government's data and voice traffic. He chose AT&T as his ISP.

"AT&T provided us the lowest-cost solution," Pond says. "We expect to have \$3.7 million in savings over five years coming primarily from reduced voice costs. ... On the data side, we're pretty much spending the same amount we used to but for 22 times more bandwidth." ■

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EYE ON THE CARRIERS

Johna Till Johnson



Voice and data: Three big myths

as voice — which upends the “voice is most important” argument.

The second questionable assumption is that voice systems are inherently engineered to greater reliability than data networks. Wrong again.

While the notion that the Internet was designed to withstand nuclear war is something of an urban legend, the distributed, probabilistic nature of the 'Net is inherently better at routing around failed nodes than the top-down, deterministic nature of the telephony network. Want proof? I was in Manhattan on Sept. 11, 2001. Though both the landline and cellular voice networks failed, I was able to send and receive e-mail and instant messages throughout the morning.

Which brings me to the third assumption: that the lack of availability of E-911 capabilities is a serious and unsolved problem that's rightfully holding back deployment of IP telephony. The error here was recently pointed out to me by the CTO of a major equipment manufacturer, who noted: “Every building I go into has a big red fire extinguisher on the wall. Employees are trained to run for that fire extinguisher whenever there's a fire. Why not install a big red [public switched telephone network] phone in every room that's just for 911 calls — and not worry about providing it via IP telephony?”

Well, duh. All these years we've been assuming that 911 had to be a built-in capability of the telephony system, which had to be able to provide the physical

location of end users. That assumption worked fine when phones were tied to physical locations, but that's no longer the case. Instead of trying to retrofit newer technologies to outdated assumptions, why not require the physical location, such as the building or facility, to provide 911 services?

Multiservice

continued from page 39

offering frame relay, ATM, point-to-point protocol, packet-over-SONET and, obviously, Ethernet services.

The switch also offers 1-to-1 hot redundancy of switch fabric and controllers, with hitless switchovers and hitless software upgrades, Hammerhead says.

A redundant, 30G bit/sec full-duplex HSX 6000 system costs less than \$100,000, Hammerhead says. The switch and its management system, which is called Pegador, are available now.

Alcatel's latest multiservice offering includes Release 2.2 of the 7670 RSP's software. The software includes RFC 2547 MPLS VPNs that can use Alcatel's ACEIS Non-Stop Routing technology; Ethernet Virtual Leased Line service over MPLS; and Ethernet to FR/ATM Service Interworking over MPLS.

MPLS service resiliency is further augmented with Label Switch Path “modify without break,” a capability to increase an LSP's bandwidth without disrupting service.

The bottom line is always question assumptions — especially those about which you're sure.

Johnson is president and chief research officer at Nemertes Research, an independent technology research firm. She can be reached at johna@nemertes.com.

New hardware for the 7670 includes the Channelized Multi-Rate 48 Line Card (MR48), which supports 2.4G bit/sec of wire-rate IP/MPLS and ATM forwarding. The card also supports concurrent routing and signaling protocols for IP/MPLS and ATM Private Network to Network Interface on the same port, Alcatel says.

The MR48 is software configurable to enable any service on any port using any protocol, the company says. Alcatel did not release pricing information. ■



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NetworkWorld

May 24, 2004

The New Data Center

Rethinking networked IT



SPOTLIGHT ON STORAGE

Storage is a hot spot for your company. Volume, management, cost and accessibility are all burning issues. How will your storage strategy handle the heat? New data center technologies such as information life-cycle management, pay-as-you-go capacity and virtualization could determine the outcome.



PLUS: OUT WITH THE OLD: Experts contrast new data center approaches against traditional methods for solving tough business problems.
FROM THE TRENCHES: One reader shares his vision of an all-virtual future.

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The New Data Center

Rethinking networked IT

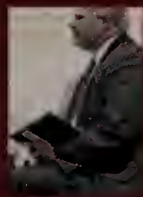
In the overheated world of enterprise storage, the decisions you make today on new data center technologies will determine if your storage strategy will shine or melt. In this, the third in a six-part series, we spotlight storage technologies like life-cycle management, pay-as-you-go capacity (see story at right) and virtualization, among others.

**SPOTLIGHT
ON STORAGE**



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Pay-as-you-go storage options are electrifying companies by making cost management and capacity planning far easier than with previous on-demand plans.

Storage as Utility

**SPOTLIGHT
ON STORAGE**

■ BY DENI CONNOR

One of the hallmarks of the new data center is flexibility, moving away from the confines of dedicated, paid-for, but nearly always underutilized or unused, resources. When it comes to storage, that flexibility means tapping into capacity on an automated, on-demand, pay-as-you-go basis.

While enterprise users have long entered into creative licensing agreements with vendors to reduce their capital outlay for storage, these latest pay-as-you-go, or metered, plans are another breed altogether. For the first time, storage actually can be purchased as a utility.

Metered storage plans, introduced in the past year, have advantages over capacity-on-demand programs. Cost management is one, and easier capacity planning another.

With metered storage, a company buys software or a server that collects information on the storage capacity being consumed on the array. The software then automatically transmits this data to the vendor's financial services department for billing. In this model, storage arrays often come configured with the amount of capacity a company estimates it will need, plus extra idle capacity. A user can grab as little or as much capacity as needed and only pay for the amount used per instance.

With capacity-on-demand, users buy a storage array with the extra capacity, and access this capacity in pre-negotiated chunks of data. They pay for all this data whether they use it or not.

St. Vincent Hospital & Health Services, a health-

care provider in Indianapolis, is using metered storage for its StorageTek L700e tape library.

"We are buying tape slots only as we need them because they are heinously expensive," says Rich Banta, senior enterprise systems engineer at the company.

Banta says he only pays for the 40% capacity on the tape library being used, while getting an additional 60% to draw from when he needs it. Turning on the latent tape slots is simply a matter of getting a license key from StorageTek, Banta says.

Like StorageTek, EMC, HP and Sun offer metered storage options. EMC's metered offering comes through its OpenScale automated billing feature, which was introduced in 1999 and revamped with automatic usage collection and billing last year. OpenScale is available on a range of EMC products — the high-end Symmetrix, midrange Clariion, Centera nearline storage and for Connectrix Fibre Channel switches, and with value-added software products including the Symmetrix Remote Data Facility and TimeFinder.

Research firm Enterprise Storage Group estimates that 30% of customers use some sort of procurement program. One of those is Deloitte





[[Storage as a utility] just makes sense. All it takes to expand the capacity is a phone call, a licensing key or just using it.]

— David Bratt, manager of technology infrastructure, H. Lee Moffitt Cancer Center

Consulting, which uses a Symmetrix 8830 loaded with 80T bytes of data. Storage-on-demand “takes some of the guessing out of our acquisition of storage,” says Erik Ericksen, CTO for the Philadelphia firm.

From HP, metered storage is available on the high-end XP and midrange StorageWorks Enterprise Virtual Array (EVA). The program, called pay per use, is designed for volatile environments where demand spikes require considerable capacity, but only for limited time periods, HP says. A software-based utility meter tracks usage and lets customers pay only for actual consumption. The meter looks at how many gigabytes have been allocated in a week or month and averages usage on a monthly basis, letting retailers and other businesses with seasonal spikes, for example, adjust the amount of storage used.

A pay-per-forecast feature lets customers vary their payments up and down to align with planned demand and revenue, says Nick van der Zweep, director of virtualization and utility computing for HP.

On metered storage, Sun offers the Utility Computing Infrastructure Procurement Service. This combines Sun UltraSPARC III processors, StorEdge storage and the Solaris operating environment. In this model, a customer's storage is monitored using Sun NetConnect software, and billing is automatically generated.

Among major systems vendors, IBM is unconvinced that a metered option is necessary. “Once people write data, they don't know how to get rid of it,” says John Power, program-marketing manager for enterprise disk at IBM. “There are requirements for these peaks in capacity, but customers aren't yet saying they want to buy it by the hour or buy it by the glass.” Power notes, however, that IBM is fine-tuning buy-it-by-the-hour constructs and a pricing scheme should its customers start requesting a metered option.

Capacity on demand

While it has stayed away from a formal metered offering so far, IBM is no stranger to the concept of making storage capacity available to users on demand. It has been offering Standby Capacity On Demand for its Enterprise Storage Server (also called Shark) and FAST arrays for two years.

Power describes how IBM's program works: A user orders a 10T-byte Shark, or FAST, taking delivery of a system that has up to 20% extra capacity built-in. The user can activate the unused capacity at any time. While the user doesn't immediately have to notify IBM, it has agreed contractually that an invoice will be issued for that capacity based on a pre-set price.

Other vendors follow the same basic model, although each has a different way of administering its on-demand storage plan. Through HP's 5-year-old Instant Capacity on Demand (ICOD) program, for example, enterprise users can buy a high-end XP array or a StorageWorks EVA with a certain amount of storage in it. HP then builds additional storage capacity into the array that, when allocated, triggers billing.

“Instant Capacity on Demand started out as you turn it on, you bought it; turn it off, you bought it,” van der Zweep says.

Although less flexible and automatic than metered offerings, capacity-on-demand programs are still attractive to enterprise users. “When you need that extra amount of storage or processing power, it literally takes a phone call and license key rather than waiting weeks to get the hardware in place,” says David Bratt, manager of technology infrastructure at H. Lee Moffitt Cancer Center, in Tampa, Fla., speaking of IBM's capacity-on-demand plan.

The cancer center recently bought an IBM pSeries 670 server with a capacity-on-demand option that lets Bratt enable memory and CPUs with a license key. “With AIX 5.2, I can dynamically assign more processing power to a p670 partition during business hours, and after business hours I can have more processing go to another partition,” he says.

Capacity-on-demand storage generally appeals to two camps of users, says Mark Lewis, executive vice president of open software at EMC. The first group comprises those who want to control their own storage but don't have the expertise in-house, while in the second camp are those who want to expense their assets rather than capitalize them. (When using capacity-on-demand, a user can capitalize or expense the capacity being used.)

The right approach?

The choice of metered or capacity-on-demand depends in large part on whether a company wants to buy or lease its storage, vendors say. That decision can vary within an IT shop.

At St. Vincent, for example, Banta uses a pay-as-you-go scheme for tape resources, but pays for disk storage outright. He sums up the company's disk-buying philosophy: “We capitalize expenses rather than expensing storage. When we need more storage, we just buy it. For disk, we think we take better advantage of Moore's Law by buying in bulk

See Utility, page 7

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Utility

continued from page 4

rather than incrementally."

HP's van der Zweep puts the money decision in context. "A customer has two different kinds of money: capital and expense. If it has capital dollars, it likes to buy things and capitalize them over three to five years," making capacity-on-demand plans such as HP's ICOD attractive. Capacity-on-demand doesn't work as well for a company that uses expense dollars because it would have to modify its equipment lease every time it turned capacity on, he explains.

As a storage buyer, Bratt says choosing between the two depends on price. "You have to decide if it makes business sense to defer that cost out or to go ahead and capitalize it," he says.

Brian Babineau, an analyst for Enterprise Storage Group, agrees. Users typically think of these licensing programs only for high-end storage, not for their midrange IBM FAStT, EMC Clariion or HP StorageWorks systems. That assertion is wrong, he says.

Because most leasing programs are priced based on capacity used, Babineau says that as disk drive sizes increase, midrange storage like the Clariion becomes a more likely candidate for capacity-on-demand, metered and even managed storage services.

While on-demand storage no doubt provides welcome flexibility, enterprise users need to be aware of the downsides. Randy Kerns, senior partner for research firm Evaluator Group, worries that such schemes could put users at a disadvantage on pricing and technology.

"The customer is paying the price of the storage at the initial purchase, whereas storage declines in price about 40% per year, so it isn't getting the right economies," he says. "Plus, [it could miss out on] advantages of technology as [arrays and drives] get faster and smaller."

No doubt, on-demand storage isn't yet perfect. But clearly, storage as a utility is the way of the future. As the Moffitt Cancer Center's Bratt says: "It just makes sense. All it takes to expand the capacity is a phone call, a license key or just using it." ■



More online!

Find more information about managed storage services and HP's "computon."

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Storage utility programs

Carving out storage capacity as part of the new data center could mean buying capacity on demand — in one of two ways — or using a managed storage service. Here are some options:

Company	Storage choice	Platform support
EMC	OpenScale automated billing program	Symmetrix, Clarion, Centera, Symmetrix Remote Data Facility
Hitachi Data Systems	On-demand and managed services are available on a case-by-case basis	Lightning, Thunder
HP	Instant Capacity on Demand program	XP Series, Enterprise Virtual Array
	Pay per use	XP Series, Enterprise Virtual Array
	Managed capacity service	XP Series, Enterprise Virtual Array
IBM	Managed storage service	Enterprise Storage Server, FAStT
	Outsourcing	Enterprise Storage Server, FAStT
	Standby Capacity on Demand program	Enterprise Storage Server, FAStT
StorageTek	Disk and Volume Services	All disk products
	Pay-as-you-go metered program	All tape products
Sun	Pay-for-use utility services	StorEdge
	Managed storage services	StorEdge
Xiotech	On-demand program	Magnitude

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SPOTLIGHT
ON STORAGE

Don't overlook audio clips, Word documents and other desktop data when plotting your new data center storage strategy.

Unstructured, yet essential

■ BY JENNIFER MEARS

At Genesys Health System, CIO Dave Holland thought he had his storage problems licked. He would ditch cumbersome, costly departmental storage in favor of a next-generation enterprise architecture that would give him a big-picture view while using storage resources more wisely. Information life-cycle management (ILM) tools, for moving data from one storage tier to the next based on business value, featured prominently in his plan. He envisioned a day when all company data would move automatically, based on certain "enterprise parameters," from a high-end EMC Symmetrix system to midlevel storage such as IBM's FAStT system and then to optical disk for the long term.

While the plan worked well for database-resident, structured data, Holland soon realized that it failed to account for the unstructured files critical to daily operations at the Flint, Mich., company. These included electronic patient charts, and digital images such as X-rays and MRIs. "When we got started with this whole project, we really didn't think of unstructured data. We really didn't understand its value," Holland says.

Spending time with physicians as they did their work brought the issue into focus. "I realized how much they looked at paper and how driven they were by those paper documents," he says, referring to the patient charts that are then scanned and turned into electronic files. "I also realized how impossible it would be for me to convert all that data from unstructured content to structured content in order to make it available. So I said, 'I've got to figure out a way to deal with unstructured data today because it's how they work, and I can't ignore that.'"

From content to storage management

Corporations everywhere are finding that unstructured content — data that traditionally has been managed by content managers, not the storage administrator — is ballooning. Today, about 80% of a company's content is unstructured — such as Word documents, PDFs, spreadsheets, digital images and audio clips, Enterprise Storage Group says. New federal regulations that mandate better access to corporate data are forcing the storage management issue.

"Content management systems employ databases to sort and order, provide access control, and search files, PowerPoints, documents, PDFs, whatever is in that system. But as you begin to get into issues of compliance, you need to think about things in a life-cycle manner," William Hurley, a senior analyst at the Enterprise Application Group, says.

Geoffrey Bock, a senior consultant with Patricia Seybold Group, agrees. "As long as enterprise content management [ECM] systems were departmental in nature and were not necessarily concerned about maintaining the corporate memory of a company for many years to come, storage was not really an issue," he says. "Now that we're building [enterprise] content repositories, which are multiple terabytes in capacity, and now that we have to organize and store this content in a meaningful way, storage is becoming more of an issue."

At Genesys, Holland is looking at an IBM software combination to integrate ECM and ILM. It already used IBM's DB2 Content Manager ECM system to provide physicians access to electronic patient data 24 hours a day and is deploying Tivoli Storage Manager for ILM. By linking the two, Holland expects unstructured content will be moved and managed within the storage system

See Unstructured, page 10

"When we got started with this [ILM] project, we really didn't think of unstructured data. We really didn't understand its value."

— Dave Holland, CIO, Genesys Health System



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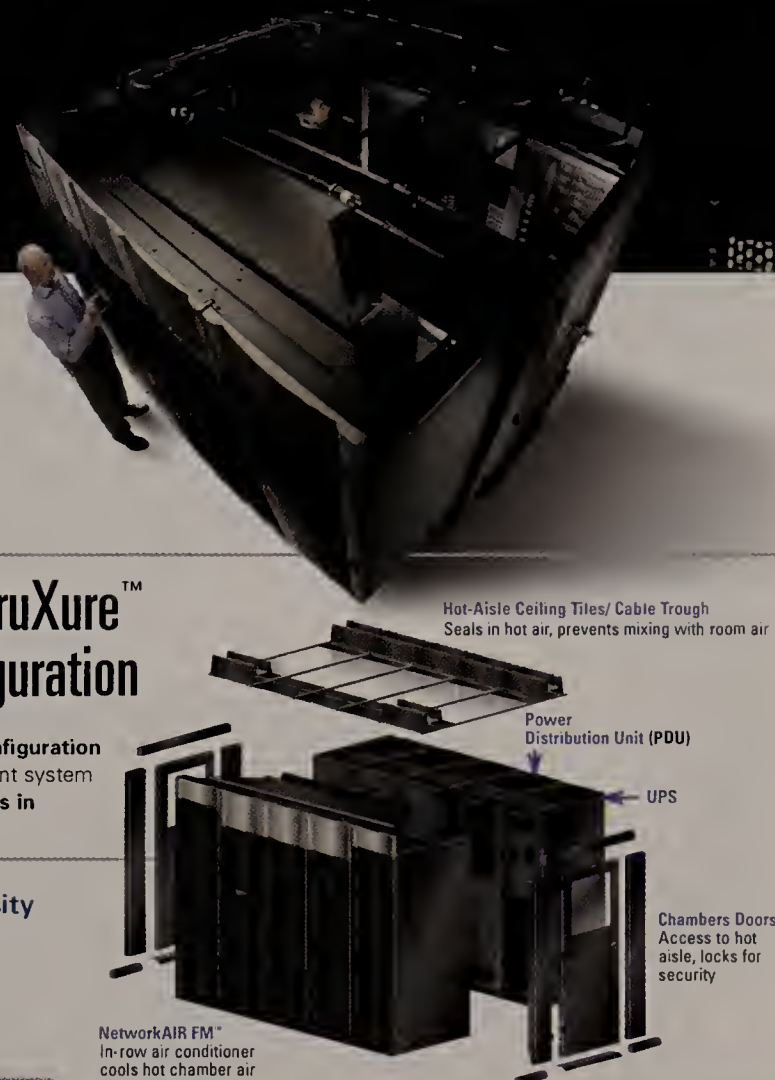
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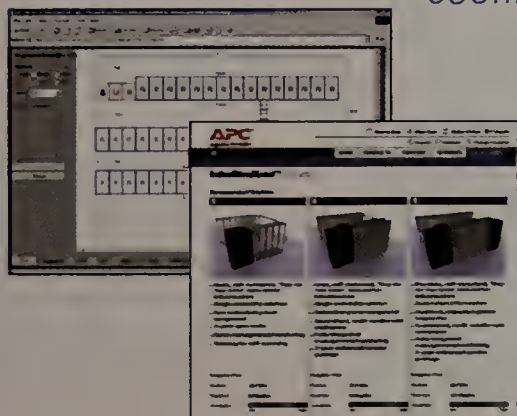


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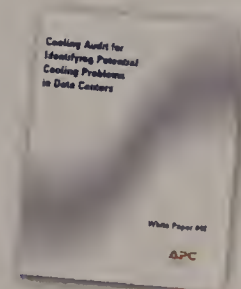
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Unstructured

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along with the typical structured data.

But integrating ECM and ILM within the new data center might be hard. With departmental content management systems, IT executives might be contending with a vari-

ety of disparate content repositories. Also, first ECM implementations tend to be messy, Bock says. "They first need to straighten out that mess and then figure out what their storage architecture is," he says.

Rising to the challenge

Users can soon expect help from vendors

on the integration challenge. For instance, ECM vendor Documentum (now part of EMC), in March announced its acquisition of Xerox's askOnce business unit. This gained it technology for building a virtual repository across sources such as other content management systems, enterprise applications and search engines.

"So now we can federate non-Documentum repositories as well as our own repositories, which means we can include things like Lotus Notes, FileNet and OpenText, into our federation and search across them, workflow across them and manage them," says Dave DeWalt, Documentum president.

By integrating Documentum with EMC storage, the content repository becomes aware of its storage options, DeWalt adds. "We have the ability now to tag information in our repository and tell that information where to store it, how long to store it, when to destroy it, when to archive it, when to compress it and what to do to it," he says.

That's functionality about which business-to-business office supply firm Corporate Express is particularly pleased. As a long-time customer of both vendors, Corporate Express is working with EMC and Documentum to implement a better, more cost-effective way to store unstructured content, says Wayne Aiello, vice president of eBusiness Services at the Broomfield, Colo., firm.

Corporate Express uses the Documentum software to manage about 22 million customer invoices and reports, mostly unstructured PDF and XML files. It is seeing rapid growth in the amount of unstructured data within the company. Aiello attributes that growth in large part to the company's use of Documentum to store those XML files and HTML and other Web content.

"Today, we store quite a bit of data in what I would call fairly expensive storage. We basically treat a lot of our data as production-level quality. And then we take very old data and archive it off. We want to get a more intelligent approach, have a more tiered approach to that," Aiello says. "It's very effective from a business perspective because the data is very accessible for quite a long period of time. But from a cost perspective, we stand to save quite a bit if we can learn to better archive it and put it on to the proper storage mechanism depending on the need. To do that without some sort of content management software like Documentum would be very difficult."

Bob Terdeman, vice president and chief information architect at Rogers Communications, feels the same about the ECM-storage integration project he's undertaken at the Toronto company. There, he says, more than 80% of the data is unstructured.

"[By integrating content management and storage tools], you'll see a huge leveling in the growth of high-speed storage that we've been using for traditional requirements," he says. "A great example is the number of documents, whether PowerPoint or Word, that are now sitting on conventional storage, that really belong in content-addressable storage. It could free up huge quantities of storage that could be returned to mission-critical use." ■

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More online! A list of EMC/storage vendor partnerships, plus a look at integration.

DocFinder: 2122



Four experts contrast new data center approaches against traditional methods for solving tough business problems.

Designing for the new data center

■ BY JULIE BORT

Sure, the new data center is all about geographically dispersed resources pooled to work as a single entity. But how would a new data center network design differ from a traditional approach to today's thorniest business problems? That's the challenge we gave to four systems integrators who specialize in new data center technologies.

While the businesses we described were fictitious, the integrators' solutions had to be based on actual work they've done for users. As it turns out, all the designers now look at a company's infrastructure as a virtualized entity built on logical components — not as a series of hardware, software and services. That perspective makes them see a server as a processing peripheral, an application as modular bits of code that can be executed on far-flung servers or an instant message as a piece of intellectual property. That new view becomes the basis for creative next-generation solutions.



ILM: When a Web site can't afford to go down

Lee Abrahamson, practice director of SAN solutions and advanced technology, CNT

Business problem: A shipping company relies heavily on its e-commerce site — so much so that it loses money every second the site is down. A disaster that takes the site down for hours to days would mean thousands — potentially millions — of dollars in lost revenue and perhaps permanent customer attrition.

Traditional approach: Create recovery points in 15-minute intervals on inexpensive but reliable tape and store copies with an off-site disaster-recovery vendor. If a disaster occurs, contact the off-site vendor. However, if this off-site vendor supports too many businesses affected, it might need days to restore systems. Some disaster-recovery sites can handle only a small percentage of their customers simultaneously.

Tape also might prove to be a bottleneck. A busy e-commerce database easily could fill 100 or more "tape mounts" in a 24-hour period (meaning the number of tapes used to back up a daily base copy of the entire database plus bundles of transactions in 15-minute intervals). Restoring many tapes would take hours, perhaps even days. Plus, for tapes stored off-site, the company also must factor in the time — likely another day — to locate and ship the tapes.

New data center approach: Use information life-cycle management (ILM) to put data on the most cost-effective media that also has the performance attributes needed to complete the storage job. Use expensive disk, mid-priced disk, less-expensive disk and tape.

One way to execute ILM is storage virtualization, which inserts storage intelligence between the host and its storage. Most virtualization engines reside "in-band" on the storage network and decouple the storage management functions (mirroring and snapshots) from the storage itself. This lets users build heterogeneous storage environments (multiple tiers and vendors). Such virtualization engines may be appliances but, eventually, they simply will be embedded in a storage network node (like a core switch).

Virtualization presents a logical view to the server. In what I call "logical-land," certain physical storage limitations (size allocations, expansions) can be removed. Storage functions such as mirroring and snap-

shots can be applied to any storage type by any vendor. The downside is a single point of failure. Without the engine, servers can't read the storage, even if they are reconnected directly to it.

Fortunately another option is available: storage-area network (SAN)-based replication of the physical data rather than the logical data. I call this "virtualization lite." This form of virtualization resides in the data path, but presents the physical disk as-is to the server. It does not require logical re-mapping of the disk. This version sacrifices some features of full virtualization but retains key features such as heterogeneous mirroring and snapshots. And if the engine is removed, servers can operate directly connected to the disk.

So when looking to save that e-commerce site from a time-consuming recovery, the first change is to replace tape with Tier 3 storage (Serial Advanced Technology Attachment) as the primary recovery mechanism. Tape would be used for archiving. Virtualization lite lets us take highly efficient snapshots (base copy plus block-level changes) of our Tier 1 storage (expensive) and put it on Tier 3 storage (inexpensive), and to mix and match vendors between tiers. By retaining snapshots on disk, a local recovery even of a large database is a matter of rolling back to a previous online snapshot, which generally takes minutes — or a few hours for an exceptionally large database. Lastly, the database is archived to tape weekly or so for long-term retention.

One bonus of virtualization lite is more affordable in-house disaster recovery. Most companies already have multiple data centers and network connectivity between them. We can tap the heterogeneous mirroring capabilities of our virtualization lite engine to move data asynchronously over lower bandwidth links to another location. This is less costly than moving physical batches of tape offsite daily. We also minimize costs by using Tier 2 or 3 storage as the replication target.

Once the primary site is ready to come back online, the virtualization lite engine at the remote location can mirror the database back to the primary site, letting the primary servers take control with minimal downtime.



Electronic message archiving: Managing out-of-control e-mail growth

Jim Geis, director of system solutions and services, Forsythe Solutions Group

Business problem: As part of a distributed IT operation, an entertainment company placed e-mail servers at each of its 15 offices. With e-mail and instant messaging (IM) use rapidly growing, predicting storage requirements for electronic messages had become difficult. Distributed operations were complicating capacity planning. And planning was about to get worse. Because of compliance regulations and the corporate world's increasingly litigious nature, the legal department mandated that IT keep a permanent record of all messages for at least seven years.

Traditional approach: Add e-mail servers to nightly back-up processes to address legal's mandate and then manage server space by reducing message stores on e-mail servers. However, this has several drawbacks. Even if Post Office Protocol is not used — so messages aren't downloaded automatically to the client and deleted from the server — users remain free to manage their own e-mail. They can delete messages stored on the server at will and exchange information with whomever they wish (although administrators might filter out certain domains). A disgruntled employee could leak messages or wipe an in-box clean of all messages. If users delete messages from the main server before a nightly backup, those messages would be gone for good. And, for users that never delete their messages, system administrators must ask them to do so when the servers run out

of space — unless the administrators automatically expunge messages older than a specified date. Should IT need to locate messages on a specified subject from an archival tape — perhaps for use in legal proceedings — finding messages based on content would be an arduous task, taking weeks to months (subjecting the company to court-imposed penalties for untimely compliance), and that's presuming the message was saved to begin with (with most IMs never saved at all).

Attention guidelines. Create a plan that coordinates the physical management of e-mail storage with logical electronic message content management, including IMs. Use an electronic message archiving infrastructure as the technology that lets you execute these guidelines and plans.

With a good electronic message archiving infrastructure, all messages would be processed and stored centrally, accessible not only by the user, but also possibly by a subset of people from various business departments — legal and managerial, to name two. Two types of servers are required — one for processing messages and another for managing archival functions. Archival management includes indexing and searching messages based on various selection criteria, from dates and sender to content. The business gets the bonus of knowledge management — the ability to mine message vaults for useful business information.

This entertainment company would consolidate to its main data center the work that most of its 15-plus mail servers were doing, leaving on-site servers and storage only at larger field offices. Remote servers would be integrated with the main messaging infrastructure, and all messages would be archived centrally (see graphic). Two main multi-processor servers would be needed for each function — message processing and archiving — but would be clustered for failover. Clustering also would give administrators a way to increase processing capacity as needed, even while absorbing remote office message processing.

Clustering for failover also mandates two storage tiers. A network-based storage scheme is required for any effective electronic message archiving (and could be chosen among any of them: TCP/IP, Fibre Channel, storage-area network, network-attached storage, iSCSI and Fibre Channel over IP). One network-based tier would be high performing and handle the continuous read and write I/O for an intense application such as e-mail. Network-based storage connectivity also complements the cluster failover by providing redundant access points.

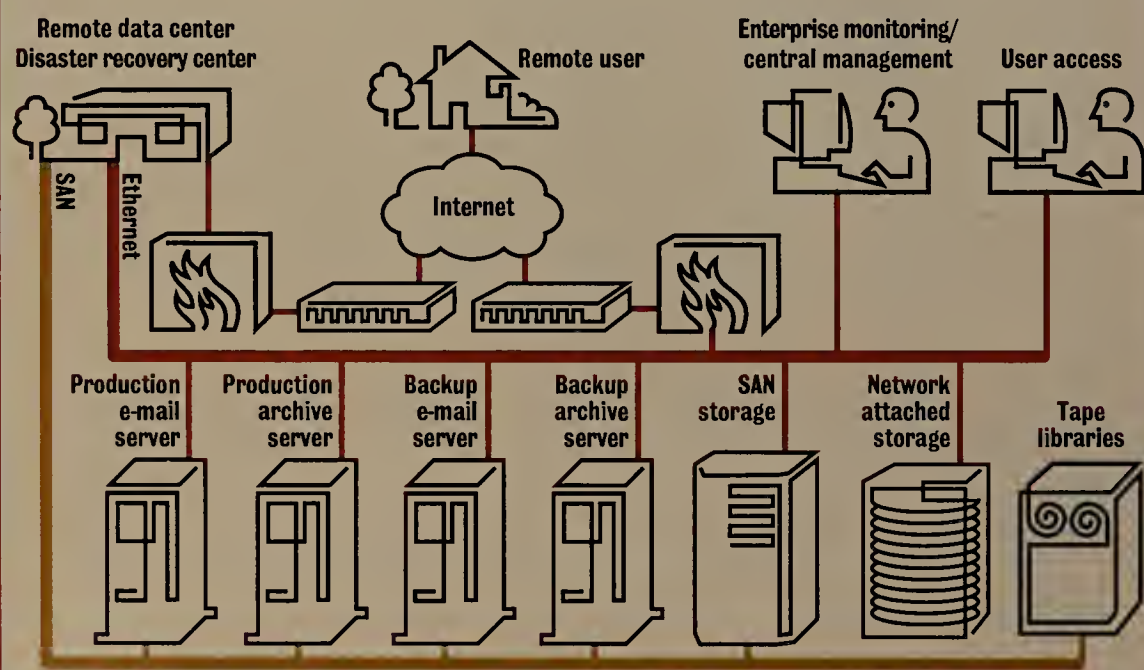
The second networked-attached tier would house the archive and would use more economical media. This tier would be somewhat slower performing but would have autonomic properties — as would the primary storage — and it would have features for short- and long-distance replication to help it integrate with disaster-recovery initiatives (the disaster-recovery location also would need duplication of the message-archiving infrastructure: servers, storage and data). Both storage tiers require easy integration into the existing tape back-up process and enterprise management and monitoring tools.

Policies are needed, too. Events and dates should trigger archival processes that move messages from the primary store to the archive. Policies that determine how IMs are to be used and integrated with the central archival store also are necessary. These should include specific "messenger" names that can be tracked and associated with staff, how and when messages would be blocked or flagged as suspect, and access control lists of who and how IMs could be used or viewed. The message archive would be indexed by content, so that key words or activities can be tracked and monitored.

Educating employees will be critical. Human resources must help draft revised "e-policies" that state proper use of electronic messages, both e-mail and IM. Expect to train users on how they would use the archive to search and retrieve messages, too.

An e-mail archiving architecture

The new data center concept includes a sturdy yet flexible electronic messaging infrastructure, complete with management, archiving/retrieval and disaster recovery.



of space — unless the administrators automatically expunge messages older than a specified date. Should IT need to locate messages on a specified subject from an archival tape — perhaps for use in legal proceedings — finding messages based on content would be an arduous task, taking weeks to months (subjecting the company to court-imposed penalties for untimely compliance), and that's presuming the message was saved to begin with (with most IMs never saved at all).

New data center approach: Treat every electronic message sent or received as a potential evidentiary fact. Know the location of electronic information, who sees it, how long to keep it and when to delete it. Develop access, creation, deletion and re-

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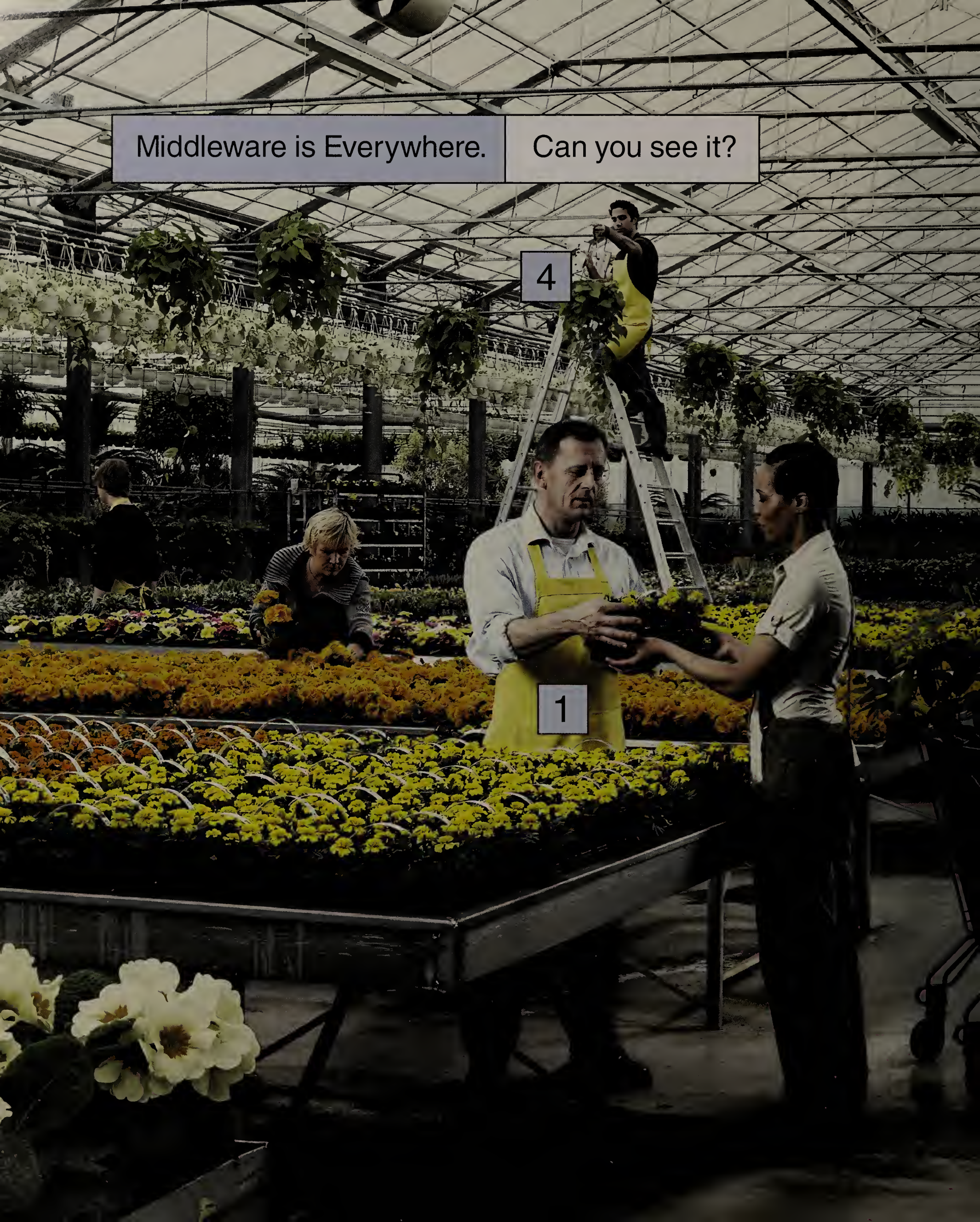
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Server virtualization: Controlling server sprawl

Omar Yakar, president, Agile360

Business problem: Faced with massive expansion, a title company was struggling to maintain IT service levels. Its employee population had tripled to 1,000 people at 40 offices in the past year. Some application decisions rested with local personnel, which meant some applications conflicted with each other and had to run on separate servers. Furthermore, the performance of shared applications and databases housed at the central data center was degenerating. The five-person IT department needed the ability to manage applications without adding headcount and while maintaining the company's decentralized style.

Traditional approach: Maintain file and application servers at each office while centralizing databases, messaging and directory services. Replicate critical application databases to each office. Opt for individual silos of servers for each application set to avoid conflicts. Increase network bandwidth to handle database and directory synchronization traffic. However, this would require managing at least 40 servers across 40 full-time, dedicated WAN links, which would incur high monthly recurring costs without even taking disaster-recovery capabilities into account. It also would continue to stretch a small staff too thin, requiring frequent travel to all 40 locations.

New data center approach: Borrow a design strategy from the application service provider model, and approach the IT operation as though it were meant to be a profit center. If it's going to be a profit center, how does it keep high customer satisfaction levels, high efficiency and low overhead? Virtualization — for storage and servers — would be key.

Server virtualization, in particular, would let business managers control their own environment, even while that environment was being provisioned and managed from a central facility. Server virtualization allows the de-coupling of logical servers (for example messaging, database and domain controllers) from hardware. It also isolates applications from the operating system and aggregates multiple storage resources as one volume. In other words, it turns a physical server into what I call a "processing peripheral."

With applications isolated from the server operating systems, an application-specific environment can run in a protected memory space rather than on the operating system. This would let a 10-year-old version of Microsoft Word run simultaneously on the same physical server with a new version, for example.

Some server virtualization products encapsulate the entire image of a physical server in one file (including the operating system, applications and direct-attached or networked storage). In these cases, the processing peripheral (the physical server), runs the virtualization software on its internal disks while the virtual server file, with its associated storage, runs on a SAN. An application then can boot from the SAN and execute on the chosen processing peripheral. Management tools let you see all of the available processing peripherals and the load on each and choose the best server to run the application.

With server virtualization, logical servers are converted to virtual servers, meaning they become files not tied to any hardware, but residing instead on logical unit numbers carved out of the SAN. They can be operated on any physical server or even moved across different models of hardware without interruption to users. Efficiencies come from consolidation of processing resources, managing load capacities across a pool of disparate resources and the ability to quickly spin up any kind of server a business manager needs. In this case, the title company can run all of its applications on two multi-processor servers, each acting as a failsafe for the other.

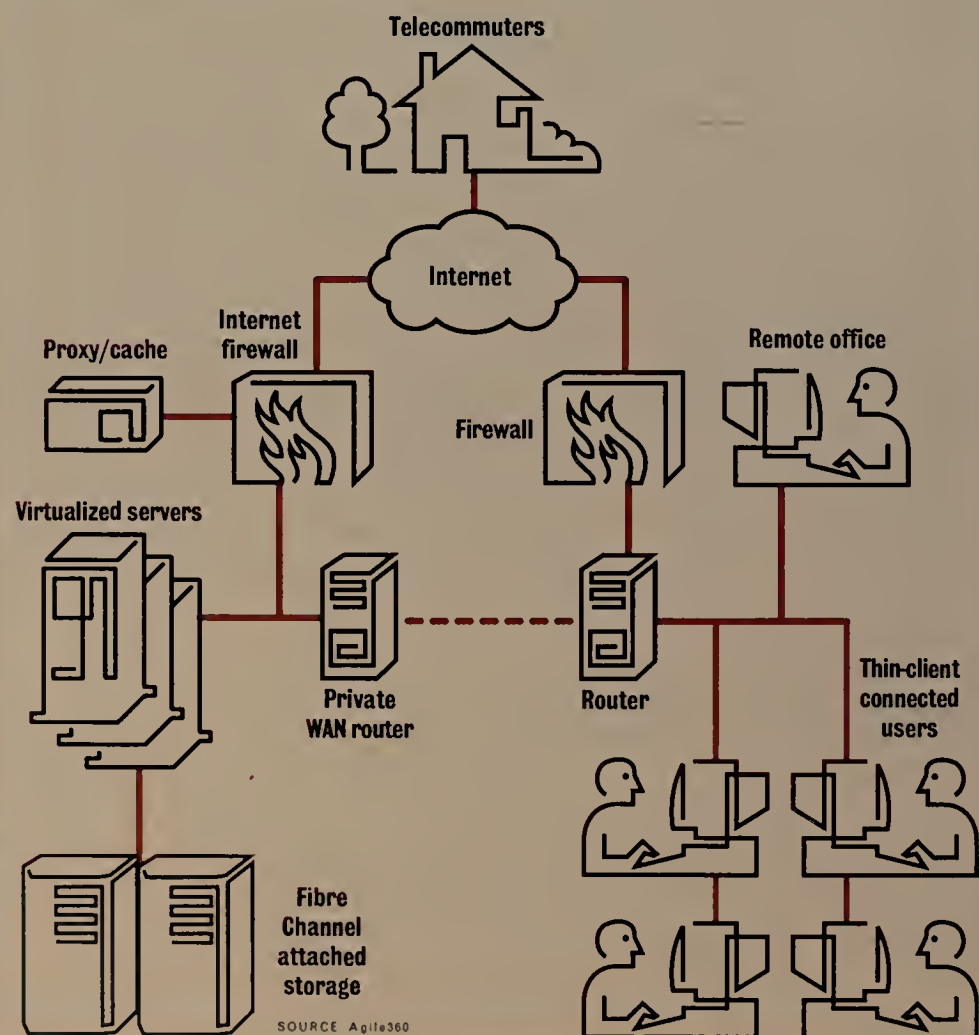
The title company also would want to make use of an ILM strategy that lets it lower storage costs by using inexpensive ATA devices (such as EMC's Content Addressed Storage [CAS]). CAS is analogous to checking your coat at a restaurant — the content (an e-mail message, image or document) is assigned a ticket and then stored; when retrieved the ticket is matched to the content and delivered.

Another crucial element is the applications. With applications now housed at a central location, the title company would want to implement a role-based Web front end that aggregates Web and Windows applications with a common user interface like a browser. Applications also should run on a thin-client design (such as Citrix or Web services). This would limit bandwidth requirements, regardless of the number of applications running simultaneously, while centralizing application server management.


While the title company still would need 40 WAN links, it could rely on smaller and less-expensive links for many offices because of thin-client computing. Low-cost VPNs might be used as failovers to each site should the WAN go down.

Processing peripherals

Virtualized servers may look like ordinary physical servers. But inside the box they are really "processing peripherals" while a SAN, such as the Fibre Channel flavor, handles storage.



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Virtualized applications: An end to sluggish app performance

Hal Stern, CTO, Sun Services

Business problem: A financial services firm has based its identity management processes on a large, consolidated directory of user information. Each user — employees and customers — has multiple roles, and the directory includes application entitlement information on each. The directory maintains a “trust” model, in which it exerts authorization control for the firm’s applications. It authenticates on a per-URL basis, meaning that every time a user accesses an application via a URL, the user is authenticated. (This ensures that applications accessed via bookmarks are authenticated on each access.)

For applications that run in the same data center as the directory, this works well; the directory need only send its authorization request across a local network, tapping the memory-resident cache on a local server. But add in two cross-country network hops, a few router or firewall transits from a far-flung remote user, and the firm’s security enforcement has slowed to a crawl (the rate of a disk access per request). Users have begun to complain about the network’s sluggish performance. IT administrators also have summarily blamed the network.

Traditional approach: Replicate the directory to each data center so each application need go no further than the local copy for authentication. Yet this approach introduces a number of operational risks. For starters, your directory server deployment has increased from one in one location to one or more per data center, each requiring security, availability and performance monitoring. You lose the flexibility to modify the directory when you are saddled with such a heavy foundation.

Plus, ensuring the consistency of all directories means watching network latency and transaction completion, and running consistency checks. Missed replication updates create confusion at best and regulation violations at worst. In the long run, replication actually slows down everything. Every time a record changes, this system generates network traffic while the directories synchronize — you have created latency (as you are now doing the equivalent of an N-phase commit over N data centers).

New data center approach: For this directory performance problem, think about the directory in virtual terms first and then map those terms to physical instances.

Specifically, separate the directory into subtrees, so that each subtree is closest (or co-resident) to the applications whose users consume that data most frequently. For instance, if most of your California users access Web-based applications through a Web server farm in the Los Angeles data center, then directory

entries for those users should be located there. Each directory typically would have entitlements for all applications, but not for all of those application users.

When applications need to bind to the directory, steer these binding requests to the “best” directory instance using a directory router or a Layer 7 switch that can inspect Lightweight Directory Access Protocol requests. So rather than first building a data center and then networking it, look at your IT design as a large, Internet-like structure “inside” the data center, and then you can use more appropriate technologies to solve the routing problem. (Layer 7 switches are likely to become critical elements of the new data center, useful for routing Web services requests, partitioning databases or directories, or even sorting traffic by service to corral certain user loads.)

How do you decide which data should be stored in which location? Examine something I call the “distance value” of data, where “distance” encodes the logical distance to request and retrieve a non-local piece of data. For instance, if I’m a user in California, and 95% of my entitlement data is in the California directory, the distance value of data in New Jersey is pretty close to zero, but near 100% for California data. When deploying a virtualized data center, maximize the distance value of data to avoid high-latency network transactions.

The corollary is that designing for what applications should do is easier than for what they shouldn’t do. But don’t let that stop you. Think about data consumed by applications from the user perspective. What data needs to be consistent at all times? What data needs to be consistent locally, and can be updated in other data centers on a lazy basis, trading off a little latency for the global consistency of a “distance value” design? Modeling application behavior isn’t as hard as it seems. Tear a page from the software developer’s Rational Unified Process and look at how each application consumes data. What are its authentication patterns? Where and when does it update directory or database entries? It doesn’t hurt to think like a software developer when you’re deploying applications built using the very same processes.

In the budding new data center realm, enterprise data is assumed to be highly distributed, yet globally accessible via a set of networks. Applications and data that are deployed into pools of virtualized resources are a major design challenge for the new data center. But it’s really the same old problem: If you ignore the limitations of your distributed system, you’ll end up with a poorly performing solution. ■

Applications as graphs

This logical depiction illustrates how increasingly complex the application infrastructure becomes as decentralized IT systems evolve.

Client/server



Objects



Web application



Web service



Next



After, next



Key: ● = Client
 ● = Object broker
 ● = Web server ● = Database ● = Server

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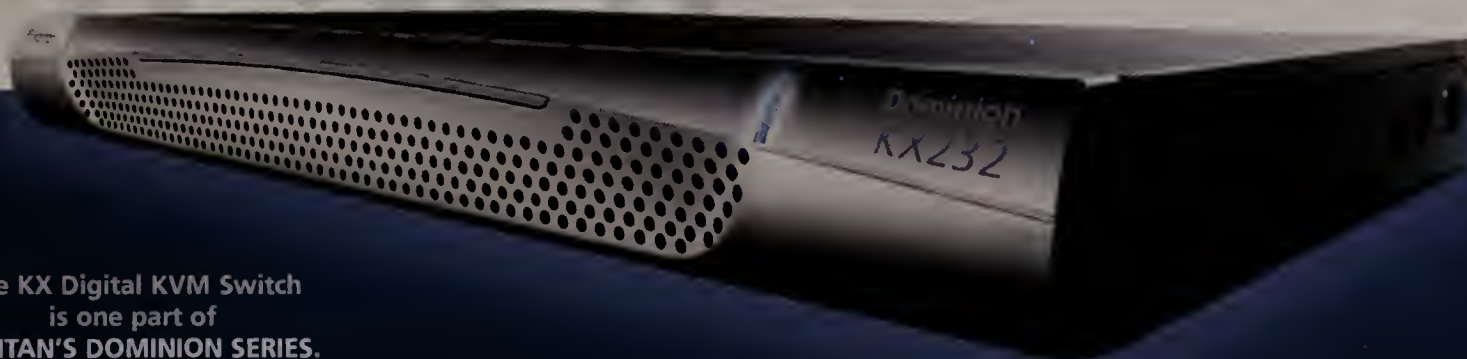
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High Read; Mostly Random	○	○	○	○	●
High Write; Mostly Sequential	○	○	○	●	●
High Read; Mostly Sequential	○	○	○	○	●
High Read; Reads Quickly Follow Writes	○	○	○	○	●

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SPOTLIGHT
ON STORAGE

One analyst explains how server and storage virtualization will one day converge, enabling unified, and even autonomic, management of today's distinct systems environments. ■ ■

A vision together

■ BY JAMIE GRUENER

For years, server and storage management have been on parallel, but separate, technology development tracks. IT executives, confronted with quickly multiplying numbers of servers and storage arrays, put them there. They've needed to treat these platforms as distinct entities that require different networks, management strategies and even staffs to maintain efficiencies within the data center.

But as companies roll out data center architectures, these two islands need to blend. Convergence, required to further simplify and improve data center efficiencies, will be quite possible with the array of new and emerging technologies. These include data center service management and automation tools, blade servers, utility and grid computing, storage-area networks (SAN), grid storage, information life-cycle management (ILM), policy-based management tools and the all-important virtualization.

Virtualization is not a new concept in the server or storage markets. Companies already are benefiting from the ability to create distinct server and storage resource pools, masking the physical components from users and applications. But integrated server and storage virtualization holds the key to true management convergence.

Where virtualization got its start

In the server market, virtualization surfaced initially for use with mainframes. In this environment, virtualization tools assisted in workload management and improved utilization.

In the late 1990s, virtualization tools emerged for Unix and Windows servers. These let multiple virtual operating systems run on one physical machine but be logically independent with consistent hardware profiles. Sometimes referred to as server resource management, these tools include partition managers, virtual machines, virtual partitions and logical partitions. Such tools have grown in importance as a

means to improve server utilization rates, as well as to better align and manage application performance on different server platforms, ranging from blade servers to large symmetrical multiprocessing systems.

In storage, the earliest use of virtualization emerged in the early 1990s with the first RAID subsystems, which essentially combined that technology with aggregation. By the late '90s, in came storage virtualization appliances aimed at improving management and utilization. Since then, storage virtualization has evolved from a stand-alone technology to a feature of storage infrastructure management tools. This means it resides on host servers, on storage arrays or, increasingly, on intelligent switches in the storage network.

Storage virtualization also has enabled higher-level management functions. With a virtualization feature, data management tools can better handle snapshots, replication, capacity on demand and policy-based decisions. Volume management, also considered a form of virtualization, has become a mandatory part of most data centers with storage networks and large storage arrays. In the coming years, it increasingly will be a feature of entry-level storage arrays that target IP storage and entry-level storage networks.

Toward the fully virtualized data center

Such evolving server and storage virtualization capabilities have prompted IT executives to begin rethinking their traditional, regimented, device-driven, client/server data center architectures. Virtualization lets them consider a model in which they organize data

center components as shared resources. This will culminate in an environment where all storage, server and network resources are virtualized into one pool.

The shift toward this ideal accelerates at each layer as new technologies take advantage of the growing computer and network power available to application sets. As IT executives reassess how to deploy and manage these technologies into a more service-driven utility data center architecture, large system vendors and start-ups will roll out technologies that will drive the evolution of the data center into a utility model.

Regarding the convergence of server and storage virtualization, management tools that tie together the provisioning and utilization of servers and storage in various ways will start emerging in the next several years. Most will come under the guise of the emerging data center automation market, which will grow to more than \$1 billion in revenue by 2006 as more customers deploy blade servers, new generations of storage arrays and storage management tools, and larger storage networks.

Over the next five years, labor-intensive, manual tasks handled piecemeal today will migrate to automated and highly intelligent tasks. (The question remains regarding how multi-vendor and heterogeneous these approaches will be, as most virtualization tools available today tend to be somewhat tied to hardware platforms or operating systems.)

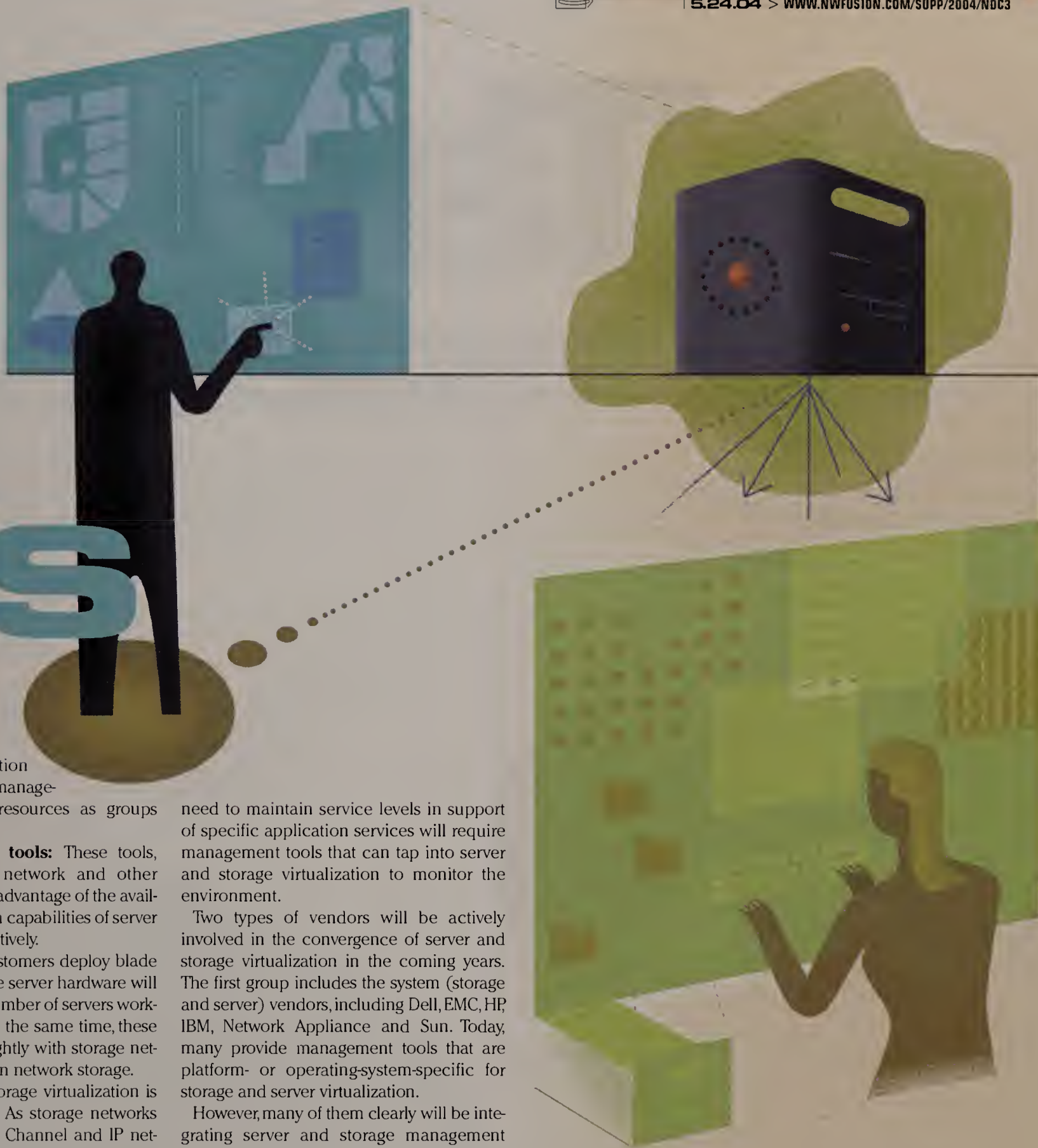
The drivers

Integrated server and storage virtualization will occur as IT executives change the way they deploy data center infrastructure. This means shifting operations, application services and hardware infrastructure into more of a service model, commonly referred to as utility computing (and a number of vendor-specific initiatives). Industry drivers that will influence the integration of server and storage virtualization longer term include:

- **Data center service management:** Many IT executives increasingly want to assign and maintain



of ess



service levels at the application level, which will require better management of server and storage resources as groups instead of single entities.

• **Data center automation tools:** These tools, which provision application, network and other resources, increasingly will take advantage of the availability, monitoring and utilization capabilities of server and storage virtualization collectively.

• **Blade servers:** As more customers deploy blade servers, the need to virtualize the server hardware will increase to mask the physical number of servers working on a specific application. At the same time, these servers will need to integrate tightly with storage networks because of the reliance on network storage.

• **Network storage:** Today, storage virtualization is actively used to manage SANs. As storage networks become more prolific for Fibre Channel and IP networks, the need to integrate with server virtualization technologies will increase at the array, host and in the storage network itself.

• **Grid computing and storage:** Grid computing and grid storage technologies rely on virtualization to develop a common pool of resources (servers and storage). As these models accelerate with more commercial deployments, corporate IT executives increasingly will want to view resources via a master management console that gauges their availability, performance and utilization.

• **ILM:** This is a new storage deployment philosophy for managing the life cycle of data from its creation to deletion. As part of this environment, the

need to maintain service levels in support of specific application services will require management tools that can tap into server and storage virtualization to monitor the environment.

Two types of vendors will be actively involved in the convergence of server and storage virtualization in the coming years. The first group includes the system (storage and server) vendors, including Dell, EMC, HP, IBM, Network Appliance and Sun. Today, many provide management tools that are platform- or operating-system-specific for storage and server virtualization.

However, many of them clearly will be integrating server and storage management platforms to address their customers' long-term management needs. An example of the convergence is EMC's purchase of VMware. This convergence should result in a consolidated platform that integrates virtualization, volume management and other infrastructure management components from EMC's storage products with VMware's server virtualization products.

The second group includes management software vendors that are tackling growing layers of data center management from the application level through the back-end storage systems. This includes companies such as Veritas Software and Computer Associates. Veritas has picked up a number of companies over the past year to broaden its data center management strategy. It acquired Ejasent for application-level virtualization and availability, and Jareva for server provisioning. Veritas likely will integrate these new products with its volume management and other storage virtualization tools.

The convergence of server and storage virtualization will accelerate over the next year as vendors start to connect the use of virtualization technologies to dif-

ferentiate themselves. The first integration wave will be product-specific — meaning vendors will tie functionality directly into their own server or storage management strategies. At the same time, server virtualization tools will continue to integrate more aggressively with broader policy-based management tools and frameworks over the next 24 months.

Integrated server and storage virtualization is predicted to arrive starting in early 2005, with full integration occurring during the next three years. By 2007, server virtualization will be a common way to manage server utilization, availability and provisioning, especially for industry-standard servers. At the same time, storage management tools will take advantage of storage virtualization as a feature that organizes storage capacity, either volumes or files. As a result, intelligent, policy-based storage management tools will be able to focus more on what the data actually represents and less on the actual location of the data. Server management tools, in turn, will leverage this same infor-

Integrated virtualization will bridge management islands that hamstring data center managers today.



Target

The new data



Scott Hopkins, always has one thing on his mind: how to make IT flexible enough to grow and shrink to match business goals. As vice president of technology planning at Harte-Hanks, a direct marketing services company in San Antonio, Texas (best known for its *PennySaver* publications), Hopkins ensures that business drives technology initiatives such as virtualization of storage, network and server resources. Hopkins says he'd like to see the lines between those distinct technology worlds blur so he can create one dynamic pool of data center resources. From the company's Billerica, Mass., data center, Hopkins shared his vision of utility computing with *Network World* Senior Writer Denise Dubie.

We've heard a lot about the intelligent, automated data center of the future. How do you define the new data center at Harte-Hanks?

The new data center, or the utility model that I talk about, is looking at IT from the shared resource perspective and not necessarily how you pay for that resource. It's a different way of looking at the resources and putting them to use for your business. To have a utility model, you need to have virtualization capabilities, and those virtualization capabilities cannot be segmented by tiered technology. When they can all be brought together, then we can achieve a truly dynamic data center.

In the past, data center managers would be very concerned

I am a great believer in automation. . . . The next step is using automation to move to a virtualization capability.



Scott Hopkins, vice president of technology planning for Harte-Hanks, shares his road map for an entirely virtual new data center.

data center



about what servers they had, what technology they had vs. looking at the data center as a utility model and being able to combine resources to provide a service. We don't look at just servers. We don't look at just the network, and we don't look at just the storage environment. You have to really look at all of that as a whole, and as a utility that has the ability to provide a service to the customer, whether it be internal or external.

Do you use virtualization today?

Right now, because of the technology and because the data center is separated into tiers — storage, server and network — we are only using quasi-virtualization. We use virtualization in the storage environment today. We also use resource management tools on the servers as well as the network through virtual LAN-type technology. And we use quality-of-service (QoS) tools to better use our virtualized network resources.

What are the advantages of using virtualization in these technology silos?

On the server side, we've been able to share more resources. Being able to logically provision server resources protects us from a security perspective and from a performance perspective. If we have multiple activities occurring on one server, none of those activities overrides the others from resource use. That's given us a lot of flexibility.

From the storage side, we have been able to reclaim a significant portion of our storage environment just by having the capability of provisioning. We went from a direct-attached environment to a storage-area network that allows us to do 'grade school' virtualization. We're not in 'college' yet, but we can better use those resources to provision storage based on business needs. If we were in college, we'd be able to allow much more sophisticated and complex virtualization to help us manage storage resources.

How does network virtualization work in your data center?

It's about introducing QoS and [virtual] LAN technology, and it's not having one network for everybody. We separate the network for security and performance reasons. Using VLANs guarantees performance and security. It's more complex, but it doesn't mean it's harder to manage.

Have you been able to consolidate any of your storage, network or server resources?

For the past 12 months or so, we have been consolidating servers. From a management perspective, we put together an asset management plan that looks at the age of our technology and at how the technology is being used. Then [we can see] how we can collapse the number of servers to either newer technology, because technology changes so rapidly, or remove them altogether. In terms of just the chip speed, you can have four of five servers run-

ning at different or slower rates — that can cost you a lot. Understanding what we have provides us cost savings in two ways. We save in terms of the management as well as the maintenance of those environments.

But consolidation isn't a one-time exercise. It's a continual process because technology changes so rapidly, and you are always going to have aging servers. You need to have a plan in place to recycle technology. We were able to reduce our costs by phasing out older technology and transitioning network load to newer technology. It's more expensive to maintain older stuff, especially when you have a lot of it. Support for older technology from vendors — and even skills in-house — sometimes seems to be harder to come by. The driver now is the ability to look at an infrastructure environment that gets us to the next step.

What is that next step?

I can look at my server, my network and my storage tape environment, but what I don't have is an overarching tool that ties those separate things together. That's the next level of the data center: delivering a product that ties network, server and storage together in a framework that allows you to manage effectively and save money.

Where does automation come into play?

I am a great believer in automation. We have done things here that automate our tape management, that use tools to help us monitor and provision our storage environment and that allow us to provision our server environment. We have automated our job processing into a job scheduler. We have an automated help desk capability that alerts staff if certain technology doesn't meet certain thresholds set for the network, the server or the storage resources. We've automated a lot of administration processes, but that's really just a first step.

The next step is using that automation to move to a virtualization capability. Again, virtualization today is defined in three tiers: the storage, the network and the servers. The key for the new data center is creation of a virtualization tool that doesn't do these separately. We have to look at this as a utility model, and not as virtualization of network, servers and storage. We need to first virtualize it as whole. Vendors are not going to make that happen without standards. And when I talk about standards, I mean both vendors agreeing on making their technology accessible and also IT managers agreeing on standard technologies to use in their organization.

What are your thoughts on vendors' claims to provide self-managing, self-healing and other intelligent features in data center hardware and software?

Are you asking if I'm a religious person? To a certain degree, I am skeptical about what has been said. It really has to have been well executed and proven for Harte-Hanks to move down that path. Conceptually, it sounds good, but can the vendors execute on those features and can they validate them? I don't know if they can. Today, I just don't see the integration or the ability to execute on the overall framework from the vendors. I hope they will eventually get there. It would be great to have an integrated tool that looks into those virtualized tiers in an automated manner and also has the intelligence to tell you whether the resource is there so that the job can be completed. It's not out there today.

You support automation, but you don't believe the vendors can provide fully automated data centers?

It's always a balance between having prudent management and very secure environments, and how you go about using automation. The virtualization technology is where we need to go, but it's still going to have to be managed by a human. As long as we have that flexibility, then we will have the capability to execute on it. There are so many things that come into consideration to do that execution that



can't be automated today. That intelligence and that knowledge can't be pulled into tools today.

How do you see applications fitting into the new data center?

To a certain degree one has to follow the other. You need to have the technology in the data center that forces the application providers to change the way they do their processes. You need to have applications that are more parallelized in processing. By that I mean not single-thread or applications that can adopt a one-to-many model. You need an application environment that supports applications sending their commands and requests out to multiple resources. The database needs to support that, the servers, the storage and the network, all before the applications. The application host needs to be able to support how you designed the infrastructure. You need to have the infrastructure that provides that capability and then applications change to meet that.

The virtualization is in the environment that touches our customers. There are certain things on the back-end that aren't as high a priority and don't need to have this reliable, scalable, affordable infrastructure in place. But that's

just our IT shop. Another shop that is a pure IT shop, and not a service bureau or hosting business, probably has a different vision. Our IT demands change when we get new customers or old customers leave us. What we want for the future is for that to be easier, more manageable and less costly.

What challenges would you advise peers to tackle first on their path to the new data center?

One of the first things to do is take inventory of the skills of your people. To be effective in this environment, the systems admin, the storage admin, the [database administrator], their roles may change, and to a certain extent their skills may need to change. The human element of moving in this direction is critical.

What technology hurdles should be addressed first?

You need to invest in certain standards, and those standards are not by manufacturer but by technology. Once you have those standards, then you can look at tool selection. Once you understand the human capital and what the standards are, then you can approach the vendor community to understand the tool set that you will need in

order to go down this path and see how well vendors match up with your needs.

What do IT managers need to ask their vendors?

You want to understand not what the vendors are necessarily doing today, but where the vendors will be in the future, what their product plans are and what their strategic directions are for technology. Then you need to weigh the validity of their ability to obtain that and execute on that against your plans.

How much should business drivers contribute to new data center technology decisions?

They are one in the same. Being able to tie technology to where the business is going and being able to execute on that is what management needs to be focused on. The technology involves another set of decisions. You need to have the people that can help you get down that path. You need to make sure you communicate with the people so they can either supplement their skills, or you can assist them in that. You need to tie it to the long-term goals, you need to develop standards, and you need to do the vendor selection. ■

Harte-Hanks' data center today

Scott Hopkins, vice president of technology planning, lords over Harte-Hanks' data center operations from his home base in Billerica, Mass. He takes us for a look inside that data center.

Data center statistics: At this data center, and this is just one data center of many, we're predominantly Unix-based Sun Solaris. We have about 47 heavy production servers, one mainframe environment and then a few hundred servers that are a healthy mix of Windows and Linux. For storage, we're very heterogeneous, with somewhere around 45T to 50T bytes of storage right now.

Mainframe plans: We have a strategy for the mainframe to be retired in the next 24 to 36 months. The technology we are deploying today to do our database construction and to service our customers is more open systems and Internet-based. The cost associated around a

good-size mainframe environment is fairly significant. You can deploy newer technology to meet the same business goal in a less-expensive environment.

Linux's role: Directionally, when we talk about the data center of the future, Linux is going to play a role. We're looking at Linux for what I would call, at this point, niche areas of the data center, fringe areas such as firewalls and some file servers, but in the future it seems that Linux as an operating system might provide us with flexibility and cost-reduction as we look at it for our database environments.

— Denise Dubie



PHOTO: TRACY POWELL

Vision

continued from page 23

mation to improve application performance, availability and server utilization.

A missing piece

The lack of a standard way for vendors' tools to communicate with each other presents a problem. And given heterogeneous enterprise server and storage environments, such a standard will be essential if integration is to work.

Today, the storage market has begun the shift to a standard way for device management. This standard, the Storage Management Initiative Standard, will give vendors a common way over time to perform storage virtualization. No similar standard exists in the server virtualization market, although many vendors have said they wish to begin building an industry-standard API to allow the communication of different server management tools. A

likely scenario is that the Desktop Management Task Force (DMTF) develops such a standard, which would take upward of three to four years to complete. The DMTF has begun to take a strong role in defining how utility computing components will speak to each other, and standardizing the virtualization layers will be crucial to any standard in the utility computing market.

To be sure, the vision and hope are attainable. One day, integrated server and storage virtualization will bridge the management islands that hamstring data center managers today based on hardware

platform, operating environment and vendor. In the longer term, if an administrator brings a new server online, storage provisioning should happen automatically. In managing the environment, IT should clearly see the relationships between servers and the storage environment. This includes paths between servers and storage, awareness of which servers and storage are hosting application services, and integration with policy tools that manage thresholds, capacity and overall availability and performance.

Lastly, having an integrated server and storage virtualization strategy could real-

ize the concept of autonomic computing. This includes allowing servers and storage infrastructure that will self-heal, dynamically change as requirements increase or decrease, and provide transparent migration of applications to servers and storage systems.

Gruener is the primary analyst focused on the server and storage markets for The Yankee Group. His coverage area includes storage management, storage best practices, storage systems, storage networking and server technologies. He can be reached at jgreuner@yankeegroup.com.

An IT checklist You can prepare today for tomorrow's integrated server and storage management potential by:

- Considering server and storage consolidation projects that leverage virtualization. While in the short term tools for server and storage virtualization will be separate, consider using these tools to assist in consolidation projects to improve utilization of servers and storage.
- Evaluating vendors based on their strategies to build integration. Over the longer term, it will be important to choose vendors that have begun to demonstrate integration with other third-party tools.
- Determining how integrated server and storage virtualization strategies could assist your move to a service-based operations model (or utility computing initiative). A core requirement of today's enterprise data center operations increasingly is focused on defining and maintaining service levels. By employing consolidated server and storage virtualization strategies, customers should meet service levels more effectively and improve efficiencies and utilization of server and storage resources.

— Jamie Gruener



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■ PRODUCTS, SERVICES AND STRATEGIES
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Personal servers simplify remote work

New wave of USB devices let users carry their PC wherever they go.

■ BY TONI KISTNER

A new way to work from anywhere is emerging. Rather than access data and



■ The continued need for broadband sharing and growing interest in entertainment networks will drive the value of home network equipment from \$8.3 billion today to \$17.1 billion in 2008, according to a new report from **In-Stat/MDR**. "Digital Domicile 2004: Home Networking Hits the Big Time" also predicts Asia will outpace North America in number of home networks by 2008, from 27% of all home networks worldwide today to 36% in 2008. North America will drop from 46% to 34% in the same period.

■ **Netgear** recently announced three partnerships to serve larger customers. For mid-market wireless networks, Netgear offers a combination of **ProSafe Wireless Access Points** and **Firetide Hotpoint Wireless Mesh Routers**, along with network management software from **Perfigo**. To provide IP telephony gear, Netgear and **ShoreTel** announced they have certified as interoperable Netgear's FSM7326P Layer 3 24+2 Managed 10/100 Switch with Power over Ethernet and the ShoreTel5 IP telephone system.

■ **Ipswitch** recently announced network-monitoring software. **WhatsUp Small Business 2004** checks the device status and availability of up to 10 devices (PCs, servers and printers), to ensure optimal performance. The software also monitors services such as HTTP, Simple Mail Transfer Protocol and e-mail. Visual reports help users track network diagnostics. Geared to companies with fewer than 50 employees and limited IT help, it costs \$295, which includes support and upgrades for one year.

applications remotely on your workstation or company servers, now you can carry your personal desktop around with you on a specialized USB flash drive and host it on any PC.

Sometimes called personal servers, microservers, pocket servers or USB appliances, these devices let companies reduce the number of laptops they support, let network executives better manage how end users access data.

Another benefit is improved endpoint security; some devices check untrusted systems for malicious code such as key loggers, and when the user is finished working, leave no trace on the system. They're easy to roll out, as most don't require a server installation.

For end users, personal servers make it easy to work from any system safely without having to lug around a laptop or worry

See **Microservers**, page 72

Pocket players

The first wave of USB personal servers is coming to market. Here's a snapshot:

Company/URL	Product	Features
Forward Solutions www.4migo.com	Migo	Access to data, Microsoft Outlook, replicates desktop environment of any Windows PC. Geared to small offices.
Key Computing www.key-computing.com	Xkey 2.0 Exchange Edition	Full Exchange client access, blocks spyware, wipes browser traces.
RedCannon www.redcannon.com	Fireball KeyPoint	Creates safe computing environment on untrusted systems, stores downloaded POP3 e-mail.
Realm Systems www.realmsys.com	Realm Key	Full Web server provides access to Web applications, includes office suite, e-mail client and CRM applications.

HomePlug trials hitting the market

■ BY TONI KISTNER

Wireless continues to dominate the headlines, but HomePlug power-line technology is making steady progress as a home network backbone and eventually will be offered by utility companies as a broadband alternative.

By 2008, the number of HomePlug devices will more than triple from 2.7 million in 2004 to 9.6 million, market research firm Parks Associates predicts.

Comcast recently announced a customer trial of HomePlug networks, and Intellon, the dominant HomePlug chip maker, announced a partnership with TV network Music Choice to demonstrate a HomePlug system that lets multiple audio streams be sent throughout the home over power lines.

Today, HomePlug 1.0 transmits data at 14M bit/sec. The upcoming HomePlug AV specification will provide 100M bit/sec speeds and quality of service (QoS) necessary for multimedia and telephony applications. The HomePlug Powerline Alliance recently finished the baseline specification, which combines elements of several competing technologies, says Oleg Logvinov, HomePlug's new president. A final specification is expected by year end.

Earlier this month at the annual HomePlug members meeting in Dallas, the HomePlug alliance began work to develop a marketing requirements document for Broadband Powerline (BPL), a HomePlug specification for delivering broadband access to the home over power lines.

HomePlug's BPL specification will transmit data to the home at 100M bit/sec with a range of about 6 miles. BPL modems will include remote provisioning and management software and support application-specific QoS and encryption.

The specification also will be interoperable with other power-line systems such as x10 and Cebus. HomePlug BPL will be compatible with the existing HomePlug 1.0 and HomePlug AV, letting, at least in theory, one technology deliver broadband services from the provider to the homes' client devices at the same or lower cost than DSL and cable.

BPL will let power companies offer broadband services and to improve power management by delivering applications such as automated meter reading, load management and fault detection. In the future, utilities will offer programmable thermostats and energy services to help prevent blackouts.

In February, EarthLink invested \$500,000 in Ambient, a power-line communications components maker, and for two years has worked with Ambient on a BPL with Con Edison. EarthLink recently announced a partnership with Progress Energy to test broadband power-line Internet service in 500 homes in Raleigh, N.C. The service will cost \$40 per month.

Although BPL is often touted as a good access method in rural areas, it also might be appealing in dense areas where 802.11 networks are overloaded and prone to interference. ■



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By far the high point of the recent Connections 2004 conference in Dallas was Louis Burns' keynote presentation. The vice president of Intel corporate laid out two visions, one you know a lot about — how emerging “digital home” technologies are transforming how we have fun — and one you don't — how the same technologies can help ease the things we worry about, namely taking care of our parents and grandparents.

“There's radical change in the industry, turbulence, intense turmoil, all of which creates a huge opportunity for those who think creatively and take risks,” Burns said.

After Burns introduced an Oregon family

to whom Intel gave a digital makeover, he shifted gears and brought out Eric Dishman, a social scientist and director of Intel Proactive Health.

Dishman set the stage: There are 550 million seniors in the world; there will be 1.2 billion by 2025. As the population ages, there will be fewer younger people to care for the elderly, and fewer professionals and family members to ensure older people take their medications and exercise regularly. “Consumers spend two to three times more today on health and wellness than they do on entertainment,” Dishman said. “We can't scale quality healthcare to such high numbers.”

To illustrate the work Intel is doing in its Seattle research lab, Dishman and Burns showed a video that showcased a day in the life of a family Intel had given a digital eldercare makeover.

The grandmother, who wanted to maintain her independence by living alone for

as long as possible, sometimes forgets to eat or take her medications. So Intel gave her a bracelet with radio frequency ID location-sensing technology, and equipped her home with discrete cameras and sensors on doors and cabinets. The sensors track her movements (or lack thereof) and alert a family member or caregiver when something's amiss. Each time she takes her medication, the event is entered into a Web log her daughter can monitor from her office in a faraway city. (Oh, I see that Mom forgot to take her morning meds today, let me give her a quick call to remind her.)

When grandma wants to take her daily walk, she heads to the door and picks up her cane. No ordinary cane, the device has Get-Smart-inspired sensors and phone, so it automatically calls a neighbor and says, “Hey, I'd like to take a walk with you,” when grandma picks it up.

Burns challenged the audience members, made up mostly of start-ups. “How do

we keep up the growing momentum? This time we do what consumers need, we work together, and we deliver it collectively. No one company can deliver this vision. Everybody's gotta play here.”

Burns stressed the need for standards-based technologies such as those being worked on by 120-member companies of the Digital Home Working Group, which it strongly supports. To spur development, Intel also has created a \$200 million Digital Home Fund, thus far investing in Digital 5, Staccato Communications, Trymedia Systems and Wisair. Intel also is working with the Center for Aging Care Technologies and the Alzheimer's Association.

“We don't care who gets the credit,” Burns said. “This is an industry thing, not a company thing.”

Kistner is managing editor of the Net.Worker section of Network World. She can be reached at tkistner@nww.com.

Microservers

continued from page 71

about making network connections. They also can be used for data backup. The flash drive market is expected to more than double its \$1.4 billion in revenue this year to \$2.9 billion by 2008, according to Gartner.

At NetWorld+Interop, four companies — Forward Solutions, Key Computing, RedCannon Security and Realm Systems — each put a different spin on the idea. Three are targeting large companies; Forward Solutions' Migo aims at the small business market, firms with 50 to 200 users.

Migo

First launched in October, Forward Solutions' Migo lets users replicate data, mail accounts and desktop settings such as wallpaper, icons and favorites onto any Windows machine.

To set up Migo, users install a client on the workstation then select which resources

Migo drive and logs on, the device automatically synchronizes e-mail accounts, updates data files and checks online for firmware and software updates. The current USB 1.1 versions include 128K bytes and 256K bytes of flash memory and cost \$150 and \$200, respectively. The upcoming 1G-byte version will cost less than \$350, and a wristwatch Migo is in development.

Xkey

Key Computing announced Xkey 2.0 Exchange Edition, which provides users their full Exchange messaging environment and data on any system. The device includes a 32-bit microprocessor and runs a full Exchange client, a database for securely storing Exchange data and a synchronization engine, so the host system doesn't need to run an Outlook client. Xkey synchronizes directly with the Exchange server behind the firewall using HTTP/Secure HTTP.

Key Computing is positioning Xkey as a more secure alternative to Outlook Web Access. Using Web Access, sensitive information can be left behind on the untrusted PC, key loggers can capture passwords or data and authentication from an untrusted source is weak. Web Access is vulnerable to open browser sessions and cached information.

When the device is plugged into a host PC, Xkey blocks malicious spyware applications and wipes all Web browser traces. It employs two-factor authentication and the datastream encrypted with a Secure Sockets Layer (SSL) VPN.

Xkey 2.0 Exchange Edition supports both USB 1.1 and 2.0, and comes in 256K-

Key
Computing is
positioning Xkey as a
secure alternative to
Outlook Web Access.

byte and 512K-byte versions, which cost \$300 and \$400, respectively. A 1G-byte version is available by request.

Fireball KeyPoint

Security software company RedCannon showed its upcoming USB device, the Fireball KeyPoint, which is expected to ship next month. Billed as a secure mobility appliance, KeyPoint also scans the system for adware, spyware, Trojans and key loggers. If anything is found, it alerts users to the type and severity, and gives them the option to continue or end the secure session, during which they can download e-mail and data.

The device includes an ARM 7 processor and provides 128-bit data encryption and an SSL VPN connection. Future versions will support authentication. As with the others, users can download files and e-mail onto the device. The 256K-byte version will cost \$150; the price for the 512K-byte version is not yet announced.

Realm Key

Realm Systems unveiled its Realm Key, which the company says will ship late this year. Realm's USB 1.1 device, the Mobile Microserver, works with the SOBA Web

Services Router, which includes management applications to control and deploy thousands of pocket servers. (SOBA stands for service-oriented business architecture.) Truly a full PC on a keychain, the

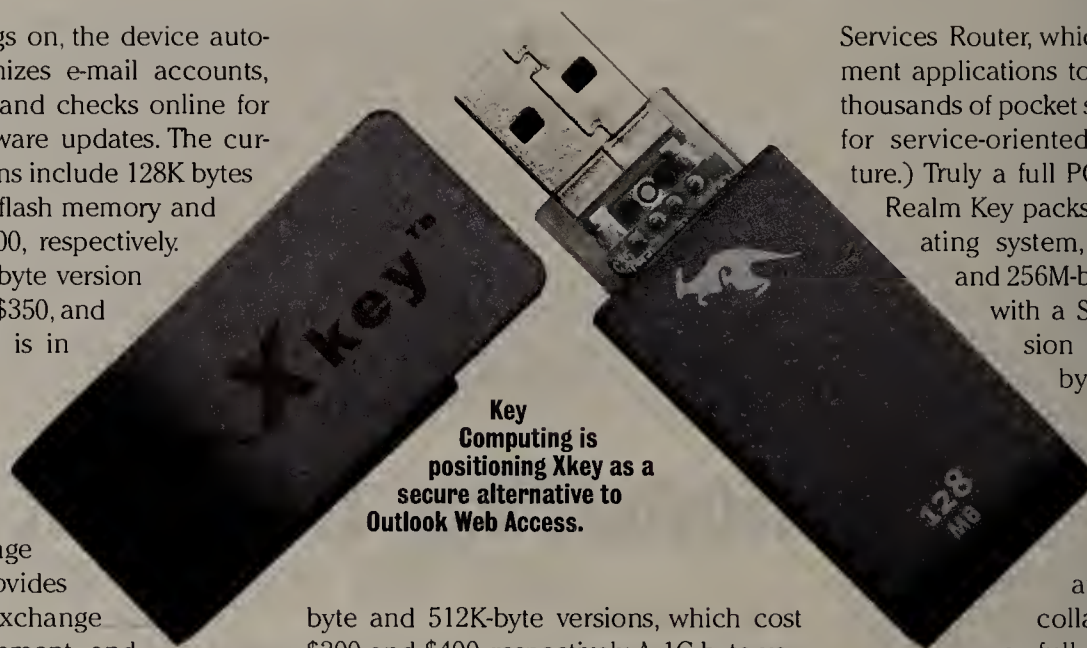
Realm Key packs an embedded operating system, 400-MHz processor and 256M-bytes of flash memory with a Secure Digital expansion slot for another 1G byte. The device will include an Outlook-like e-mail client, full Web browser, CRM software, file backup and management, and collaboration tools, even a full office productivity suite.

The Realm Key will synchronize files automatically and launch applications directly. It also will support Web services and Web-enabled legacy applications. An “instant on” feature lets you unplug from the host system and then plug back in later right where you left off. It works with Windows, Macintosh and Linux desktops. There are also slots for Secure Digital expansion and a Wi-Fi connection. The SOBA router is a rack-mounted router that manages pocket services, provides XML security for Web services, monitors Web services, and provides content filtering and Web services routing. It will include a wizard for discovering, configuring and securing the devices.

The company will begin beta-testing this summer and ship at fall Comdex. Pricing and availability information is not yet available. ■



Forward Solutions' Migo lets users replicate data through two-layer protection.



Key Computing is positioning Xkey as a secure alternative to Outlook Web Access.



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Technology Update

■ AN INSIDE LOOK AT THE TECHNOLOGIES AND STANDARDS SHAPING YOUR NETWORK

10GBase-CX4 lowers 10G Ethernet cost

■ BY DAN DOVE

Despite the myriad of media types available for 10G Ethernet networking, the technology is too expensive for many corporations to realize its performance benefits. That's why the IEEE developed 10GBase-CX4, a lower-cost switch interface.

The 802.3ak task force formed in 2002 to quickly create a standard for 10G Ethernet that operates on twin-axial cable assemblies of up to 50 feet. With Gigabit Ethernet rapidly moving to the desktop, a higher-speed fat pipe would be needed between desktop switches and distribution switches to combine traffic in much the way that Gigabit Ethernet had done for 10/100M bit/sec networks.

When using Gigabit links for stacking Gigabit switches, the typical throughput is well below the aggregate bandwidth of the switches and therefore performance is limited. With 10GBase-CX4, performance can be scaled to take advantage of this faster pipe. In addition to responding to the broad demand for high-speed interconnects within wiring closets, 10GBase-CX4 also can be used in data centers to aggregate servers.

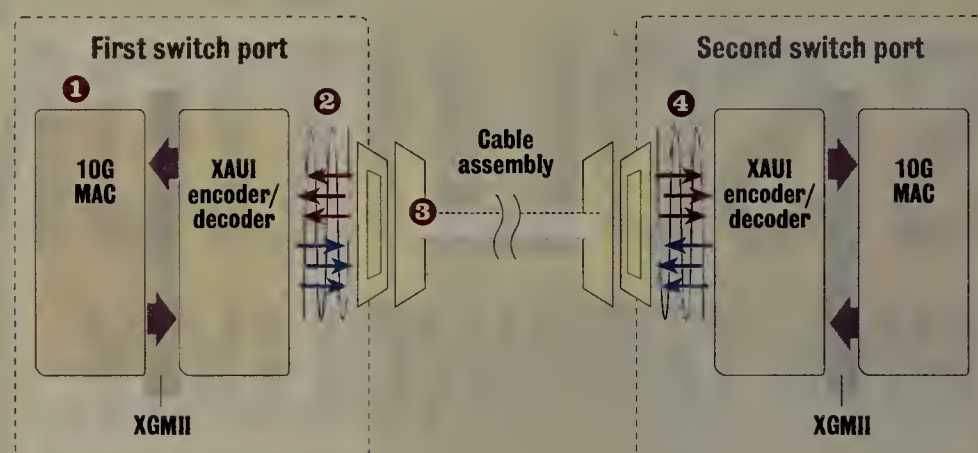
Range is not critical for this application because most switches reside in a wiring closet. But cost is paramount, as the uplinks are often integrated directly into desktop switches and the cost of the uplinks is amortized into the per-port cost of the switch.

Approved in February, 802.3ak is economical because it reuses portions of 802.3 and other standards to simplify and lower the cost of implementation. For example, 802.3ak specifies the same type

■ HOW IT WORKS

10GBase-CX4

Also known as 802.3ak, the technology extends the XAUI interface designed for chip-to-chip communications to distances of up to 50 feet by using pre-emphasis, equalization and twin-axial cables.



- ① Technology uses the same 10 Gigabit MAC, XGMII interface and XAUI encoder/decoder as specified in 802.3 to break signal into four differential paths at 3.125 gbauds.
- ② Transmit pre-emphasis concentrates on high-frequency components to compensate for loss in PC assembly, connectors and cable assembly.
- ③ Connector and cable assembly are designed for InfiniBand but specified by 802.3ak to accommodate equalization requirements.
- ④ The receive equalizer provides final boost to signals reduced by cable assembly.

of connectors and cables now used with 4X InfiniBand, letting vendors incorporate 10GBase-CX4 capability directly within highly integrated chips. It also minimizes design, installation and maintenance costs by preserving 802.3 network architecture, management and software features. As a result, the IEEE expects installation costs for copper 10GBase-CX4 interconnections to be one-tenth that of com-

parable 10GBase-optical solutions.

Ethernet engineering

10GBase-CX4 uses the XAUI (10 Gigabit Attachment Unit Interface) specified in 802.3ae, and the 4X connector that's used for InfiniBand.

Rather than attempt to transmit 10 gigabits over a single copper link, the 802.3ak specification uses four transmitters and

four receivers operating differentially over a bundle of very thin twin-axial cables to transmit 2.5G bit/sec each at a baud rate of 3.125 GHz per channel with 8B10B coding. This requires four differential pairs in each direction for a total of eight twin-axial channels per assembly.

Pre-emphasis and receiver equalization are used to boost the signal energy to compensate for loss at high frequencies. Pre-emphasis is a technique whereby the high-frequency content of a transmitted signal is boosted or low-frequency content is attenuated to compensate for high-frequency loss in cable assembly. Receiver equalization is a similar process applied at the receiver. Using pre-emphasis reduces the dynamic-range requirements on the receiver equalizer and makes it easier to implement in standard silicon.

Cable assemblies for CX4 are slightly different from the InfiniBand cable assemblies from which they were derived. The 802.3ak committee chose to specify them using a more precise method, and therefore some InfiniBand cables might not meet CX4 specifications.

While CX4 cables are not as readily available as Category 5e patch cords, multiple suppliers offer them. Unlike Category 5e cables, which are field terminable, CX4 cables require factory termination, so customers must specify length. Longer cables tend to be larger in diameter, but for typical distances of less than 20 feet the diameter of a CX4 cable is close to that of Category 5e.

Dove is chair of the IEEE 802.3ak task force and principal engineer for HP ProCurve's networking business. He can be reached at dan.dove@hp.com.

Ask Dr. Internet

By Steve Blass

Where can I find an open source Secure Sockets Layer VPN package for Windows?

OpenVPN (openvpn.sourceforge.net) is an open source SSL VPN system that supports servers and clients across several platforms. Version 1 required unique ports for individual VPN client connections. Version 2 (now in beta) provides a multi-client server mode. The OpenVPN Windows installer includes all the binaries for servers and

clients. The difference between servers and clients is in the configuration files you create. After downloading and installing OpenVPN on two machines, configure a "shared secret" connection between the two systems. Then enable Transport Layer Security/SSL authentication to use multi-client server mode. The OpenVPN documentation shows how to use the included OpenSSL to generate and deploy the required security certificates from your chosen certificate

authority. To create your own OpenVPN Windows-based certificate authority, copy openssl.cnf from the source code ZIP file into your OpenVPN "bin" directory, edit the text to match your system, and add "-configopenssl.cnf" to the openssl commands given in the documentation.

Blass is a network architect at Change@Work in Houston. He can be reached at dr.internet@changeatwork.com.



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GEARHEAD INSIDE THE NETWORK MACHINE

Mark
Gibbs



Over the past two weeks we've been delving into Really Simple Syndication, and this week we're going to wrap it up with a cool tool that relies on another cool tool.

For all you Outlook users, we have an add-in called NewsGator for Outlook (www.newsgator.com) that integrates RSS feeds with your Outlook folder system.

Because users tend to spend a lot of time in Outlook, it makes sense to have NewsGator deliver your newsfeeds into the same environment, providing a powerful way to integrate information.

When you install NewsGator (a painless process), you choose a base folder under which NewsGator creates a subfolder for each feed you want to follow. When you select the base folder, you will see the default NewsGator summary page listing in the right-hand document pane. On the left side of the pane is a list of the most recent items from all feeds with a list of all unread items below. On the right side, all of the

RSS technology, final take

feeds are listed with a count of the total number of new items in all feeds and the number of new items for each feed.

You can click on any of the individual items and news feeds to go to the item content or list of items in a feed. You also can force a refresh of the summary page, run the feed search wizard to add new feeds to NewsGator or customize the program.

Customizing lets you change how often feeds are refreshed, how the base folder presentation is laid out, define blog posting attributes, connect to the NewsGator online subscription services or change how NewsGator looks by specifying a new eXtensible Stylesheet Language Transformation file for NewsGator to apply to its output.

NewsGator can aggregate RSS and Atom feeds along with Net News Transfer Protocol (NNTP) sources. Subscription-based NewsGator services also are available that provide feeds based on keywords or a specific item's content (these services also can be accessed via Post Office Protocol clients or Web browsers independently of NewsGator).

When you select an item from a news feed you can forward it, set follow-ups, search, print — in fact, do most of the things you can do with any e-mail item.

NewsGator also supports its own plug-ins, which let you do things such as post to NNTP groups, archive NewsGator posts to SQL databases and post directly to Weblogs (blogs) that support the Blogger API (for example, Blogger), those that support the MetaWeblog API (such as Radio Userland), pMachine and BlogX.

Our only complaint with NewsGator is that, although you can forward a feed item by e-mail, the program does not treat feed items like e-mails. This is important because it means you can't apply rules to feed items — a real disappointment.

If you test or buy NewsGator you may notice that under the menu path "Tools\Options\Other\Advanced Options\Add-In Manager" there is nothing about NewsGator. There is, however, a new add-in called Redemption Helper Outlook Extension, also known as Redemption Library or just Redemption (although a previous application might have already installed this library). This is our other cool tool. Redemption (www.nwfusion.com, DocFinder: 2132) solves a number of problems that anyone seriously programming Outlook will have come across. Chief among these problems are the access limitations inherent in Office 2002 and 2003 and created by applying the Outlook Email Security Up-

date (released in 2000) or Service Pack 2 for Microsoft Office 98 and 2000.

The security changes add e-mail attachment filtering, which blocks executable code, Visual Basic scripts, photo images and Internet shortcuts. It also requires that you confirm each time an application tries to access Outlook's address book.

Redemption is a COM library that uses Microsoft's Extended Messaging Application Programming Interface to replace the features the update blocks. Once registered on the system, Redemption's services are accessible to any programming language, such as VB, VBA, VC++ and Delphi.

Among its other features, Redemption gets around another Outlook limitation by giving access to a number of functions and properties that aren't exposed in the Outlook object model, such as direct access to the RTF body of any Outlook item, Internet message headers and sender e-mail addresses. But we digressed ...

We really like NewsGator. It is stable, works well and, being integrated with Outlook and supporting blog posting, is really effective. It is a steal at \$29. The Redemption library is free.

No access restrictions at gearhead@gibbs.com.



Cool Tools

Quick takes
on high-tech toys
By Keith Shaw

Two companies recently sent in their new Tablet PCs, one a slate style that also includes an optional keyboard and the other a "convertible" tablet that looks more like a notebook, but converts into a slate.

We were impressed with all the new hardware features these devices have, including extra ports, embedded wireless and a fingerprint scanner. Even some of the vendor-specific bundled software was better. But the underlying Microsoft Tablet PC operating system still leaves lots to be desired, as the handwriting recognition and other applications don't make us happy and make us want to run right back to our old, reliable notebooks. The hardware makers have done a great job with their latest equipment, but users need to wait until the next version of the Tablet PC operating system (hopefully by year-end) comes out.

The scoop: Portege M205 laptop/tablet PC, from Toshiba, about \$2,000.

What it does: It's a laptop! It's a tablet! It's two devices in one slick package. Opened up, it's a basic laptop with a 1.5-GHz Pentium M processor, 60G-byte hard drive, 512M bytes of

The Portege M205 screen swivels so you can show the display to a colleague easier.

Tablets: Great hardware, OS is just OK

RAM, integrated 802.11g wireless, NVIDIA graphics card and external CD/DVD drive (optional). Things get funky when you spin the 12.1-inch LCD screen around like Linda Blair's head in "The Exorcist." Then you're staring at the back of the screen, but a person sitting across the conference room can watch whatever presentation you are showing.

From there, when you fold the screen back down on the keyboard, you've got a regular slate-style tablet. Take out the stylus and you're good to go, with the ability to write on the screen. The Portege includes several interesting applications, including Alias Sketchbook Pro (pen-based sketching tool with annotation features) and the Franklin Covey Tablet Planner (writing out calendar and to-do lists with the tablet and then converting the text).

Why it's cool: Being able to write notes and to draw with a stylus is the reason to buy an M200 series product. You

have the choice of a variety of formats, including the basics — a blank page and a lined one — all the way to graphs and music.

You scratch away with the stylus, then highlight the area you want to save and either save it as is or convert it to text. For a left-handed scribbler, this is where it gets interesting. We've used tablets in the past, and have always been disappointed by their inability to read handwriting, but the Toshiba did an OK job.

We wouldn't recommend writing your doctoral thesis

on one of these. But if you need to take some quick notes at a meeting and would rather do it electronically and be able to store and send the notes around without having to transcribe them, or if you want to be able to draw a diagram and then save it, this is what you've been looking for.

Grade: ★★★★★ (out of five)

The scoop: M1400, from Motion Computing, about \$2,000.

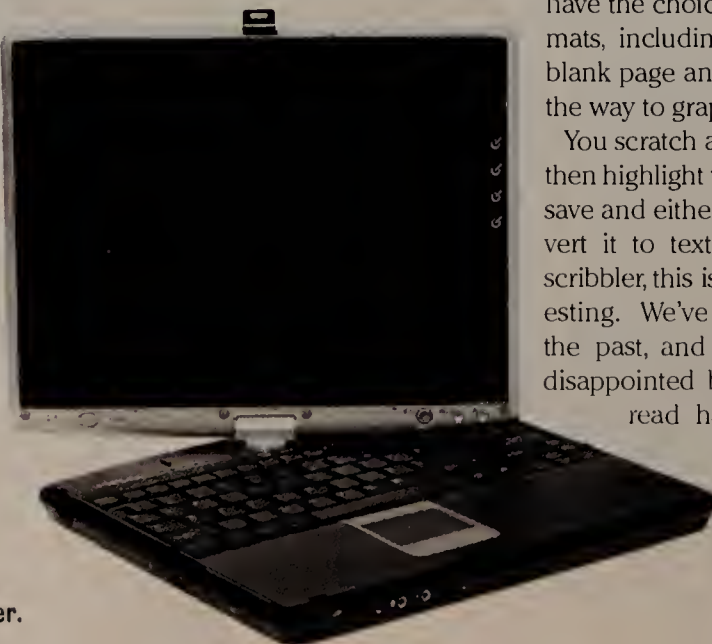
What it does: The M1400 is a slate-style Tablet PC that includes a 1.1-GHz Pentium M Ultra-Low Voltage processor, 60G-byte hard drive, 256M bytes of RAM (upgradeable to 2G bytes), built-in 802.11g wireless and a standard fingerprint reader for authentication. The 12.1-inch XGA display includes a wide viewing angle, which makes it good for showing presentations or designs to several people around a conference room table.

For a more traditional look and feel, the M1400 includes an optional keyboard that attaches via USB port to make it "look" more like a notebook, or you can attach the tablet to a docking station and use a large keyboard and monitor.

Why it's cool: Having a fully featured PC that you can carry around with you is the main appeal of the M1400, and writing on the screen for note-taking certainly adds points. Motion Computing did a great job with its extra hardware features, such as an ambient light sensor for improved power management, and a software "dashboard" that lets you control several tablet functions (such as microphone settings) from one screen. The inclusion of the fingerprint reader also adds to the security of the data stored on the tablet.

Grade: ★★★★★

Shaw can be reached at kshaw@nww.com. Features Editor Neal Weinberg contributed to this report.



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ON TECHNOLOGY

John Dix

Focus on processes, not the technology

How is it that two companies can spend the same amount on IT and one will get a solid business bounce out of the investment and the other will see nowhere near the gain?

Erik Brynjolfsson, a professor of management at the MIT Sloan School of Management and the director of MIT's Center for eBusiness, shared his thoughts and research on the matter last week at the 2004 MIT Sloan CIO Symposium.

He started by dispensing with the age-old productivity paradox. "Economists agree today that IT has been the single most important factor in productivity growth since the mid '90s," he said.

Productivity growth was 1.4% from 1973 until the early '90s, and many economists thought it had settled there for good. But in 1995 it jumped to 2.5% and by 2000 had reached 4.5%. Some economists thought it would settle back down after the bubble burst, but surprise, surprise, it has stayed at 4.5% even as a recession settled in.

That growth can be attributed to IT, Brynjolfsson said. But not the technology itself; the business process changes enabled by the technology, such as new ways of dealing with suppliers and customers.

Brynjolfsson shared research showing average component costs associated with a \$20.5 million software IT project: hardware cost, \$800,000; software, \$3.2 million; implementation (piloting, process reengineering, consulting) \$9.3 million; and deployment (labor, travel, training) \$7.5 million.

IT tangibles — the software and hardware — usually get treated as the real investment, and intangibles get less attention, yet they account for the bulk of the costs.

"Today's companies are becoming less and less dependent on physical assets and more and more dependent on information and software assets," Brynjolfsson said. IT is a catalyst for productivity surge, but organization capital accounts for the bulk of the real benefit.

Based on extensive survey data, Brynjolfsson concludes that the companies that are IT-intensive AND marry organizational practices to computing usage get the best return on their dollar. He calls companies that get it right "digital organizations."

A member of the audience asked Brynjolfsson how he reconciles his views with those put forth in the *Harvard Business Review* story "IT doesn't matter."

"IT by itself isn't the story," he said. "What gives advantage is having optimized business practices in place. Business processes are difficult to discover and difficult to imitate."

— John Dix
Editor in chief
jdix@nww.com

'Cure' is worse than disease

Regarding "XP fix previews impact of a more secure Windows" (www.nwfusion.com, DocFinder: 2126): A service pack that causes more problems than it fixes — what will Microsoft think of next? Instead of fixing its operating system code to cure the security vulnerabilities, Microsoft modifies the Internet Connection Firewall so that it breaks applications. I will be very hesitant to apply this service pack to my XP installations.

Stephen Smith
Network systems analyst
Teleplan Videocom Solutions
New Castle, Del.

Licensing not so important

I would like to echo the sentiments Stuart Owen expresses in his letter to the editor "In defense of Microsoft" (DocFinder: 1524). It is time to stop talking about "costly Microsoft licensing fees." I support the entire computing infrastructure of a \$1.5 billion dollar company. Of the entire operating budget, only 0.8% of the dollars are allocated to Microsoft licensing fees. And we are a Microsoft shop; no Unix or Linux. I don't think I am going to be a hero to the CFO if I cut my licensing costs from 0.8% to 0.4%. There are more important issues in the typical IT budget than Microsoft licensing costs.

Paul Lour
Greenwich, Conn.

Call for cell phone civility

A recent item in "The Good, the Bad, the Ugly" (April 12, page 6) concerns Cingular's "inconsiderate cell phone man" ads being shown in movie theaters. I have not seen the ads, so I cannot comment on their content. But as for Cingular, I say,

E-mail letters to jdix@nww.com or send them to John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.

opinions!

"Good for them!" It's about time someone showed those insensitive boors just how obnoxious cell phones in public really are. People need to relearn old-fashioned manners, courtesy and civility. Cingular should be lauded for having the audacity to speak out.

George Augustas
Dallas

Coercive tactic

Regarding "Cisco to revamp IOS software" (DocFinder: 2127): In this case, Cisco should put the IPSec management information base (MIB) on the PIX firewall. Because the PIX does not have an IPSec MIB, you cannot monitor any VPN connections to it. In other words, you cannot answer the simple questions of who has connected to your VPN and how long they have been there. By not putting the IPSec MIB in the PIX, Cisco twists everyone's arm to buy a VPN concentrator.

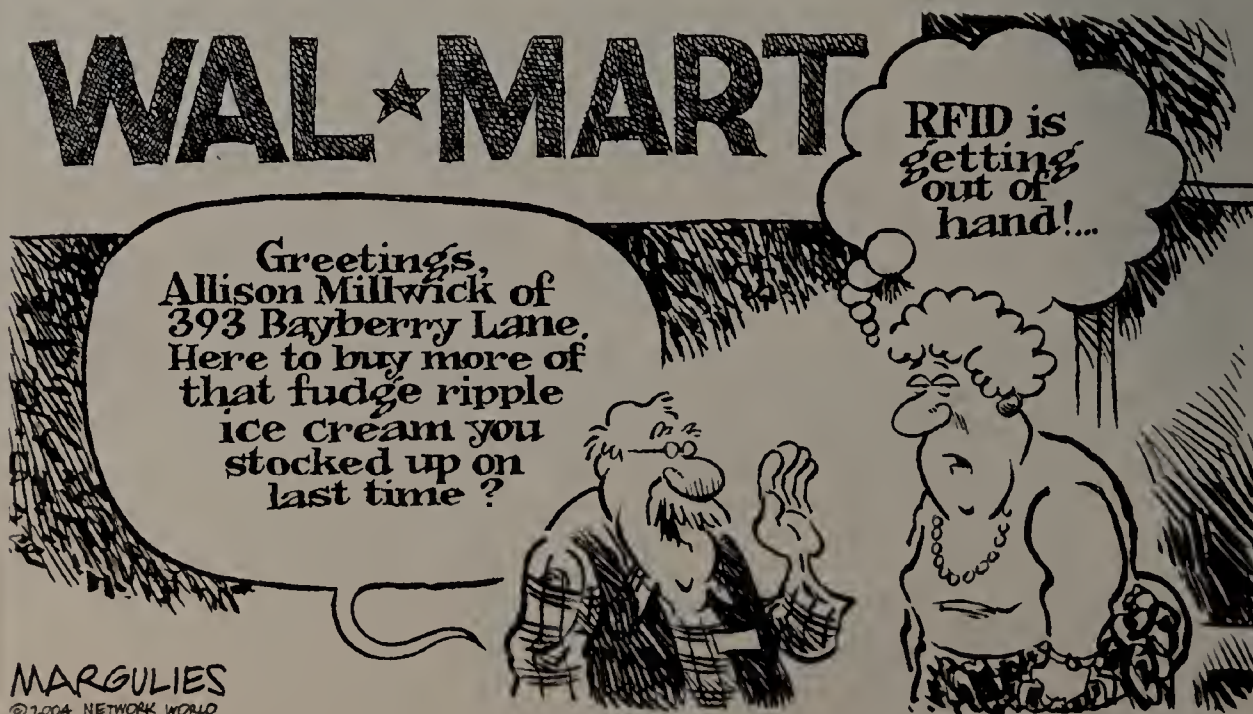
Gregg Branham
Alpharetta, Ga.

Starved for attention

The story "Security holes force firms to rethink coding processes" (DocFinder: 2128) notes that Microsoft has 20,000 software engineers and 12 security specialists. That means each specialist handles 1,666 software engineers, giving each a maximum of 1.25 hours of undivided attention per year. I guess the attention paid to individual software engineers by the security specialists is reflected in the security record of Microsoft products.

John Telford
Portland, Ore.

■ Readers share their views on spyware.
See more letters on PAGE 80.



MARGULIES
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STAYING CONNECTED

Edward Horrell

Wireless is growing, in the number of companies offering service and the number of cell towers being built. With calling plans in the dozens per carrier and a vast array of devices available, sales are good and getting better.

But good sales don't always lead to profits. The FCC has seen to that. When the FCC allowed for number portability last November, it created a firestorm in wireless that had never been seen before. The fire will be stoked a little more when it is carried to smaller markets this month.

Number portability has let users switch from carrier to carrier without the previous pain associated with changing. This has created a tremendous churning effect, which results in activity, which looks good on paper. It's never been easier for consumers to change their wireless provider — just avoid a contract and switch as you like. If you like an unlimited calling plan better than limited minutes, change away. Prefer Catherine Zeta-Jones to a mysterious man in black? Go get her. Keep your old number, and no one is the worse for the change.

But make no mistake about it: The sweet spot for the wireless industry is not the consumer. This market is flattening as the users simply change around to other carriers. The sweet spot is enterprise business — specifically, the market referred to as machine-to-machine. Machine-to-machine involves the communication between, and control of, remote machines (or systems) in real time, with the goal of lowering operating costs and letting carriers offer new applications and services. One industry observer, Alexander Associates, estimates that machine-to-machine wireless will be a \$4 billion revenue generator by 2008, and that there will be more machine-to-machine con-

Wireless' new target: The enterprise

nections than cell phones in eight years.

This is where the landscape is going to change. Consumers base their wireless buying decisions on the locations of retail stores and the carriers' spokespersons. Enterprise decisions are made more slowly and deliberately. Consumers like color and plans; enterprise businesses like applications and technology.

What this means is that the wireless industry is going to follow in the footsteps of its older brother, the long-distance industry. Rates will be leveled and lowered as competition for enterprise accounts increases. (Today's large corporations pay less than ever for interexchange service. One MCI representative told me that he starts his sales calls with "How much are you willing to pay?" before he even gets started with the selling process.)

Lower prices mean lower margins, which mean fewer profits for all. This results in two types of wireless carriers: those that will *do* lunch and those that will *be* lunch. The former are going to eat the latter until the market is downsized to normalcy. The shakeout will begin soon and will be swift.

My suggestion to enterprise wireless users is to try to have a contract as flexible for your business as the one you have at home. Make every effort to negotiate an opt-out provision regarding the assignment of your contract in the event of an acquisition. Don't sign long-term contracts. In other words, try to be on the "do-lunch" side of the equation.

Horrell is an independent telecommunications consultant, speaker and author in Memphis, Tenn. He can be reached at edwardhorrell@mindspring.com or via his Web site, www.edhorrell.com.

The sweet spot is enterprise business — specifically, the market referred to as machine-to-machine.



ABOVE THE CLOUD

James Kobielski

Grid computing is no empty buzz phrase. In fact, it's a very substantial approach for scaling and optimizing distributed hardware resources. Grids aggregate idle processor cycles, storage capacity and other resources throughout networks, thereby serving client applications with supercomputer-

grade performance. Depending on how broadly they're implemented, grids can extend dynamic resource brokering, parallel processing and load balancing to all computers on an intranet, extranet and even a portion of the Internet.

Over the past year, grid computing has become an increasingly prominent theme in the road maps of platform, tool and middleware vendors. In January, several vendors announced development of the Web Services Resource Framework (WSRF) specifications for grid interoperability. In March, the Organization for the Advancement of Structured Information Standards (OASIS) established a technical committee to develop WSRF into an open Web services standard. Then last month, close to 20 vendors announced the establishment of the Enterprise Grid Alliance (EGA) to create a grid interoperability reference model, and address security and other issues critical to grids in corporate server clusters.

So grid is starting to mature, as a market and an approach for distributed processing. But the road to maturity is long, and grid computing won't be ready for enterprise prime time for at least another three to five years. Some significant milestones must be reached before corporations can take for granted the presence of a ubiquitous, platform-integrated, standards-based grid infrastructure.

First, OASIS' WSRF technical committee must finish work on its specifications. Then these specifications must be ratified and adopted broadly by grid vendors, including the Globus Alliance, which provides the industry's dominant open source grid tool kit. Other grid industry groups must coordinate their work to provide comprehensive grid ref-

Grid not ready for prime time

erence models, reference implementations, best practices guidelines and interoperability events. All this could take two to three years, considering the complexity of WSRF's diverse specifications and the need to square them with other emerging Web services standards in areas such as security and management.

Furthermore, platform vendors must integrate grid features and standards natively into their products. Today, many production grids are implemented with Globus' open source tool kit or with point products from small vendors. Currently, some platform vendors — most notably, HP, IBM, Oracle and Sun — have strong grid solutions and directions. But several other important platform vendors — most notably, Microsoft, Novell and BEA Systems — lack grid functionality and have yet to announce commitments to grid-enable their products. For example, grid is mentioned nowhere in Microsoft's Longhorn wave for 2006/2007; consequently, the vendor probably won't address grid in its core platforms until 2009 or 2010 at the earliest.

Finally, grid won't truly mature till it breaks out of its traditional niche: serving the massive parallel processing needs of supercomputing applications in scientific and engineering environments. Grid potentially could be used to scale and accelerate all manner of applications, including search engines and application, database and mail servers. Oracle and IBM are ahead of the other platform vendors in this regard, having grid-enabled their respective application servers and, in Oracle's case, its database and portal servers.

For the rest of this decade, grid computing will deepen its presence in its traditional scientific and engineering niche. However, grids increasingly also will penetrate a broader range of commercial environments, thanks to new standards and vendors' growing commitment to this powerful paradigm.

Kobielski is a senior analyst with Burton Group, an IT advisory service that provides in-depth technology analysis for network planners. He can be reached at (703) 924-6224 or jkobielski@burtongroup.com.

Grid computing won't be ready for enterprise prime time for another three to five years, at least.

spy

Mark Gibbs' Backspin column "The cost of spyware" (www.nwfusion.com, DocFinder: 2060) resonated with Network World readers. Here's what you had to say about your own experiences with this most unwelcome "guest."

A losing battle

Mark Gibbs' spyware column doesn't discuss the many legitimate sites that aid scumware vendors in their endeavors by bundling spyware on downloads, or hosting ActiveX or Java code that exploits visitors' browsers. More importantly, many of these scumware providers are violating federal laws and exploiting children with their "products."

The bundling of spyware with other products has gotten to the realm of the absurd, and it directly affects everyone. I am the senior engineer for a large school district, and spyware is one of our top three service issues. We routinely see hundreds of installed malware, spyware and trackers on PCs in the school district. The net effect has been to tie up our support techs in trying to eliminate or alleviate spyware infestations. In particular, some of the newer spyware is taking on virus-like qualities and actively tries to prevent removal or attempts to defeat or cripple anti-spyware tools.

The biggest problem we have encountered is the "adware" products that serve up pop-up windows. We have seen repeated instances of this kind of scumware serving up pornography, which is particularly disturbing when it shows up on computers serving young children. This is a blatant violation of federal and local pornography statutes, but little is being done.

We now have to maintain a blocklist on our primary router that prevents access to thousands of sites affiliated with these scumware vendors. We spend a significant amount of time and effort to prevent and block this garbage, and like spam, it's a losing fight.

Michael Dunne
Senior network administrator
Abilene Independent School District
Abilene, Texas

Productivity killer

Spyware is one of the most pervasive drags on productivity that I have ever seen. I am baffled as to why anti-virus vendors consider spyware to be a separate topic; they could kill the anti-spyware software market, yet they don't. And it amazes me that anti-spyware vendors don't charge more for their products.

As a consultant I make most of my money these days by removing spyware for clients. These programs slow down people's computers and sometimes they make them unusable, yet the anti-virus vendors seem to ignore them. The worst problems, as Mark Gibbs points out, are with Winsock 2 Layered Service Provider, which most Internet users eventually will encounter. (And yes, I question why Microsoft seems to ignore the problem that it has created.)

I find that almost every client PC I work on has some sort of spyware on it. By removing it, I can almost always guarantee a performance improvement. I am left wondering why Microsoft has provided the hooks to "drive-by" software installs in the first place.

Scott Dennis
Owner and consulting engineer
InfoTech Alaska
Anchorage



Cost even higher

The increasing presence of spyware is almost taking on a life of its own among our customers. My company is spending an ever-increasing amount of time chasing down and eliminating spyware on our customers' PCs. Just recently I was called to a site where one PC was almost unusable. The main user had applied security patches religiously and ran a virus scan on a regular basis; unfortunately, other personnel had access to the machine when he was not present. Pop-up ads were appearing immediately upon logging on to the PC and would bury the screen if Internet Explorer were opened. It took over four hours and several techniques, including spyware removal software (more than one program) and manual deletion, to regain a measure of control.

Spyware is beginning to cause more

problems than almost any other "malfunction" I can think of. I have a sinking feeling that Gibbs' estimate of spyware's cost to an organization would fall short if this problem were to be investigated more thoroughly.

John Burr
Systems engineer
MicroVantage
Las Vegas

Inherently evil

The main reason I object to spyware is that I didn't ask for it, don't want it and believe it's basically evil. Yes, evil. If I met you on the street and slipped my hand into your pocket surreptitiously, retrieved your wallet, rummaged around and checked out your driver's license, credit cards, photos, notes, concert tickets or whatever else you had in there, it would be a crime. Or say I followed you around day and night, watching everywhere you went or shopped. Stalking. A crime, even if I claimed to have your best interests in mind. Even if all I did was use the information I gathered to "tailor" my sales efforts to offer you good deals on products and services I felt might interest you, it still would be a crime. Why is it not a crime when the same thing happens on my PC?

My organization spends a fair amount of money in hardware and software licensing costs every year to protect our network and data. We don't treat adware any differently

than spam and viruses. If we didn't ask for it, we don't want it, and it has no business on our systems.

Howard Stewart
Portsmouth, Ohio

A form of hacking

The idea that spyware is legal is preposterous. Every bit of spyware I receive is done through the exploitation of a security hole, which by definition is a form of hacking and, as such, should be illegal for that reason alone. In addition, the way it installs could classify it as a Trojan horse or a worm/virus. I never accepted a license agreement that installed spyware; all my spyware came from pushed installs by Web sites.

Most people whose systems are crippled by spyware end up reformatting their hard drives, not realizing that their systems can be recovered. This stuff is bad. Very bad. But until enough people complain about it, it won't stop.

Today my system is locked down so tight, my son can't play his games without my explicit permission. I load the game up for him in a secured environment, so even if his game were the next Michelangelo, it would be harmless.

Armand Welsh
Newport Beach, Calif.

Winsock LSP fix

I'm the network administrator for the internal network of a local cable company. I became involved with our technicians for installing cable modems, and the main problem we're experiencing is getting customers to realize that they have adware/spyware on their computers.

Through several hours of testing, troubleshooting and trying to find the right combination of fixes to speed up customers' connections and sometimes just get them connected, the following steps have proven to be a 30- to 60-minute fix for all of our customers:

- Install and run Ad-Aware 6.0 (check for updates first). We also like to use Spybot Search and Destroy, but Ad-Aware is less trouble to run and install on a customer's PC.

- If the Internet connection is suddenly destroyed (Internet Explorer can't browse or get e-mail), run the WinsockXPfix.exe found at www.tntmax.com/Download/Software/WinsockXPfix.exe/view. This will fix the Winsock files, which might get deleted when removing spyware/adware.

- Go to www.pcpitstop.com and run a free test on your system. This will check your PC for any problems you might be experiencing and provide fixes for many of them.

Michael Lesley
Hannibal, Mo.



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"We have a motto that says IT will not stand in the way of what the business needs to do." — **Robert Otto**

Robert Otto CIO and CTO

*The United States Postal Service,
Washington, D.C.*

Robert Otto started his professional career as a clerk. Today he is the CIO and CTO of the United States Postal Service®, which processes about 55 percent of the world's daily mail volume. Tasked with reengineering the USPS's technology infrastructure, he's led an effort to consolidate and centralize disparate systems, standardize tools and vendors, upgrade the network, and embrace the Web and wireless technology.

Otto and his team have built an advanced computing environment that has saved the USPS® some \$50 million annually. More than 30 Web-enabled self-service applications help employees manage items such as health benefits and life insurance, as well as training on demand.

Last year, more than 176 million consumers used the usps.com website. The USPS also introduced a hugely popular desktop service called Click-N-Ship®, which allows mailers to create their own shipping labels.

Great Moment at Work: "Seeing the positive impact this project has had on the employees and customers of the USPS."

Microsoft Office System salutes those who have done great work in the IT field.

Great Moments at Work.

Success Stories of an IT Hero



IronPort to the Email Security Rescue

The George Washington University installs IronPort C-Series appliances to halt a virus onslaught.

Talk about your close call. Jeff Baxter doesn't like to think about what might have happened if The George Washington University hadn't been evaluating IronPort's email gateway appliance when the Netsky.T worm hit in early April. "We normally get about 400,000 messages a day, a maximum of 500,000 if a virus hits," says Baxter, manager of Technology Engineering in GW's Information Systems and Services department. "During the first couple of days of the Netsky infection, we were getting over a million virus-infected emails a day."

The university had recently upgraded its central email servers, so that setup was working fine. But the IT group wasn't entirely pleased with the performance of the edge email servers that handled incoming message traffic and virus scanning. "We were already using the appliance model for some of our security firewalls, so we thought, why not use it for edge message routing, anti-virus and maybe anti-spam," Baxter says.

His team began evaluating several such devices and was particularly impressed with IronPort's C-Series Messaging Gateway. The C-Series was designed from the ground up to handle high-volume email traffic while also protecting against worm and virus onslaughts —

without bogging down. It can support up to 10,000 simultaneous connections, with performance 10 to 20 times faster than competitive products that use general-purpose operating systems and hardware.

GW's IT staff was performing an evaluation of the IronPort C-Series when Netsky.T hit like a ton of bricks. The central mail system managed to hold its own, but the edge devices were overwhelmed.

While the old edge servers were maxed at 100% [CPU utilization], each IronPort appliance processed all mail using only 10% of its capacity.

"CPUs went to 100% utilization and stopped accepting or delivering mail," Baxter recalls. "Thousands and thousands of messages were stuck on those machines." System administrators were working in shifts around the clock, but "it was a losing battle, like bailing a boat when the hole is bigger than

your bucket," Baxter says.

The IT group considered adding two more big mail servers, but they would take days to provision. "And we were afraid we'd have to keep adding more," Baxter says. Instead, the group decided to step up its evaluation of the IronPort appliances by putting them into production mode.

With the help of a technician who was flown in by IronPort overnight, GW got two boxes up and running in less than five and a half hours. As soon as the IronPort gateways were online, mail starting flowing again. While the old edge servers were maxed at 100%, each IronPort appliance processed all mail using only 10% of its capacity.

Since then, Baxter says the university has had no problems with traffic spikes or virus attacks. Furthermore, his group is using the C-Series' integrated Sophos anti-virus software and IronPort Mail Flow Monitor to strengthen defenses against future attacks.

"Mail Flow Monitor lets you know which IP addresses, both internally and outside, are sending the most mail," Baxter says. "It was very difficult to track that information on our old systems; IronPort gives us easy-to-read real-time reports, so we can see what's going on."

Administrators can then target domains and user machines that are sending an unusually large number of messages or virus-infected email. Over time, such measures will make the university network less vulnerable to attack, while cutting down on bandwidth and CPU utilization.

The university is now considering taking advantage of other features enabled by IronPort's SMTPi architecture. They include IronPort's Reputation Filters™ technology and SenderBase™ reputation database that together can dramatically curb spam by identifying email senders and assessing their past behavior (see story, this page).

The IT staff also plans to install two more C-Series devices at another data center site. GW is leading the way among higher educational institutions in pursuing advanced business continuity and disaster recovery capabilities, with data centers in D.C. as well as Virginia. Having IronPort devices in both centers will help GW meet its goal of eliminating unscheduled email downtime.

SMTPi: A Foundation for Intelligent Email Handling

The IronPort Systems family of messaging gateway appliances brings security and trust to email by implementing the company's SMTPi architecture.

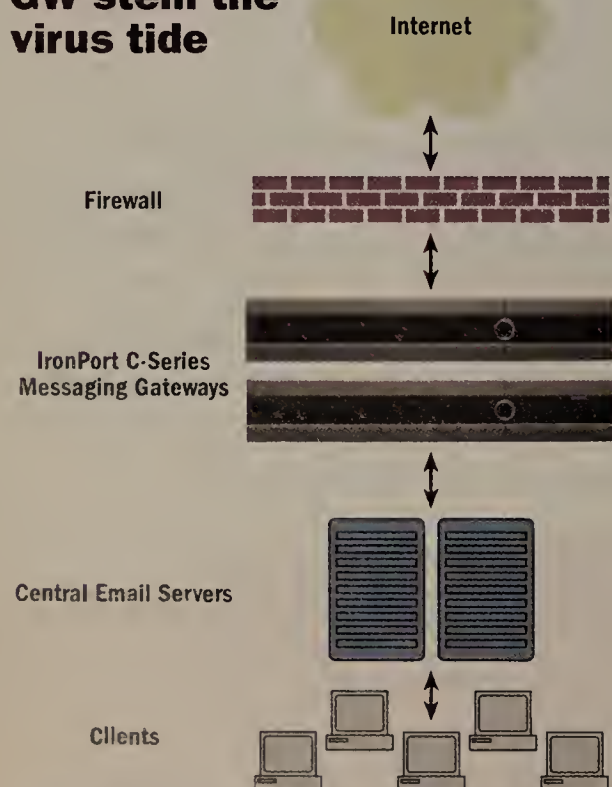
SMTPi adds a crucial "identity" element to the Simple Mail Transfer Protocol (SMTP), along with reputation and policy components. SMTPi first seeks to establish the identity of an email sender by verifying the IP address of the sending message transfer agent (MTA), which is far more difficult to forge than the simple return address. Going forward, SMTPi will incorporate additional identity authentication, including emerging systems from Microsoft, Yahoo! and others that allow companies to determine which mail servers are allowed to send email using a particular domain name.

Ultimately, SMTPi will also support "universal" identity systems that use digital certificates to achieve a high level of accuracy in identifying email senders, even down to the individual level.

Once an email sender has been accurately identified, the next step is to assess his email history or reputation using IronPort's SenderBase, which acts like a credit reporting system for email senders. SenderBase (www.senderbase.org) monitors various factors to assess the reputation of a sender, including global sending volume, complaint levels, whether a sender's DNS resolves properly and accepts return mail, blacklist information and other parameters. SenderBase renders a statistical score, the SenderBase Reputation Score, which provides an assessment of the email sender's reliability.

The SenderBase Reputation Score enables email administrators to create policies for intelligently handling incoming mail. When combined with the threat prevention, content scanning, Brightmail-based spam detection and Sophos antivirus capabilities integrated with the high-performance IronPort Messaging Gateway appliances, SMTPi provides powerful mail handling capabilities.

IronPort helps GW stem the virus tide



The George Washington University was evaluating the IronPort C-Series Messaging Gateway when the Netsky.T worm hit in April, crippling its mail servers. In just five hours, the school pressed the IronPort appliance into production and saw edge mail server utilization drop from 100% to 10%.

Learn more about SMTPi and IronPort appliances

Download the white paper, "SMTPi: An Email Security Architecture," as well as data sheets on IronPort's family of Messaging Gateway Appliances.

Visit: www.ironport.com/future

CLEAR CHOICE

TEST

VoIP security wares

Breaking through IP telephony

In tests, Avaya and Cisco attempt to strut VoIP security stuff.

■ BY EDWIN MIER, RANDALL BIRDSALL AND RODNEY THAYER, NETWORK WORLD LAB ALLIANCE

Can you hacker-proof your IP telephony network? The short answer — as demonstrated in the first-ever public test on this topic — is: Yes, pretty much. But it strongly depends on whose IP PBX you use and more importantly, whether you're willing to spend the dollars and the time it takes in terms of network security planning, network and personnel resources, and extra security gear.

In our tests, we developed a plan for realistically assessing how secure vendors' IP telephony packages are — or aren't — against a determined, malicious attacker. While we invited the top five vendors by VoIP market share to participate, only Cisco and Avaya stepped up to the challenge.

Cisco's "maximum-security" VoIP configuration — a midsize CallManager-based system, with call control, voice mail, gateway; a Catalyst 4500- and 6500-based Layer 2/Layer 3 infrastructure; a copious supply of intrusion-detection system (IDS) and PIX firewall security add-ons; plus a half-dozen Cisco security gurus supporting the test — earned our most Secure rating (see rating criteria, below). Our attack team couldn't disrupt, or even disturb, Cisco's phone operations after three days of trying.

Avaya submitted two configurations: A no-frills, out-of-the-box Avaya IP telephony deployment with no extra-priced security options; and a maximum-security alternative — featuring the same

VoIP gear, but with an added firewall and Layer 2/Layer 3 infrastructure switches from Extreme Networks. Security weaknesses earned the basic Avaya configuration a so-so Vulnerable rating, while the hardened package fared better with an overall Resistant rating.

The ground rules (see page 84) imposed some limitations on the four-member assault team. For example, only hacker tools and attacks that were available on the Internet could be used. Attacks had to be launched via an end-user data port or IP phone connection, as if the hacker had access to a standard office cube; attackers could not disassemble or dissect the vendor's IP phone — and so on.

The objective was to disrupt phone communications. Via the data and IP phone connections, the attack team used scanning tools and other techniques to see and learn what they could of the topology. The attack team was told nothing of the vendor's configuration beforehand. After discerning and identifying "targets," the hackers then systematically launched dozens of attacks, at times in combinations concurrently.

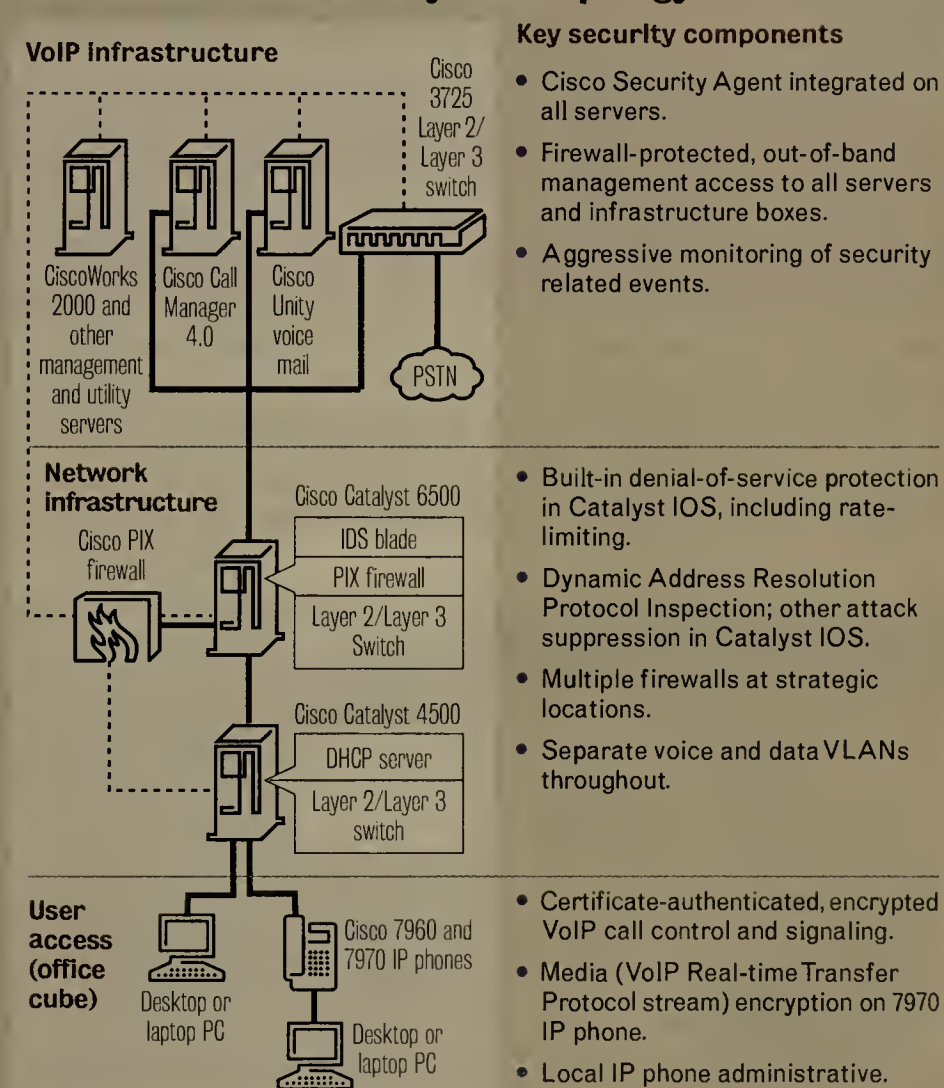
Given the limits set by our ground rules and the duration of the tests, it is important to note that the attacks launched against these products are not as severe as those that could be encountered in an actual deployment. We consulted with a half-dozen security experts regarding these attacks, and they concluded that the attacks were of moderate intensity.

We will not disclose in this story complete details of vendors' specific vulnerabilities uncovered and exploited, so as not to put customers using these products at risk. These exploits are therefore discussed in general terms.

Like a rock

Cisco proved it could build a VoIP network that a sophisticated hacker assault team could not break or even noticeably disturb. The elaborate IP-telephony package — with underlying Layer 2 and Layer 3 infrastructure and assorted security add-ons (see "Cisco maximum-security

Cisco maximum-security VoIP topology



topology," above) — is the most secure that Cisco's collective network security expertise could muster, and employs every defensive weapon in the Cisco arsenal.

The Cisco topology tested certainly represents more security options and stricter security settings than most users currently employ, but all are available today for a price. The optional components included: two stand-alone PIX firewalls (about \$8,000 each); another firewall on a blade in the backbone Catalyst 6500 (about \$35,000); an IDS blade also in the 6500 (about \$30,000); an entirely separate, out-of-band management subnet

and various security-management applications. The price for the firewall and IDS pieces came to slightly more than \$80,000. Cisco says, though, that it threw in systems that it could readily get its hands on, and that the same job could be done with less-expensive firewall and IDS models from Cisco.

The firewalls brought some very useful, high-level security features to the table. One is the notion of trusted vs. untrusted sides — and the untrusted interfaces were always pointed toward our hackers. Another is a stateful understanding of protocols, so that only specific VoIP protocols required for VoIP were allowed

VoIP security rating scale

Overall rating	Maximum impact that assault team could achieve
Secure	No perceptible disruption to voice service.
Resistant	Only minor and/or temporary disturbance(s).
Vulnerable	Phone service affecting many phone users could be disrupted for a protracted period, via a sophisticated or coordinated attack.
Open	Phone service affecting most phone users could be significantly disrupted, indefinitely, via a fairly straightforward assault.
Unsecure	Phone system or service affecting all users could be readily and indefinitely disabled.

with requests and responses passing only in the appropriate directions. Other firewall features that came into play during this test included:

- Stateful inspection of VoIP call control, and the ability to network address translation and tunnel call control through the firewall.

- TCP intercept, which makes sure TCP connections are completed. This can prevent certain denial-of-service (DoS) assaults on the CallManager.

- Secure Skinny Call-Control Protocol (Secure SCCP) support. This is the newer, more secure form of Cisco's proprietary SCCP that the company used in this VoIP network. Secure SCCP uses a TCP connection rather than User Datagram Protocol (UDP) and encrypts call control information.

Enter CallManager

Version 4.0 of CallManager, which handles call control and is the heart of Cisco's IP telephony package, includes some new security-related features. Key among them is the company's first VoIP encryption implementation. At this time voice-stream (Real-time Transfer Protocol [RTP]) encryption is supported only on Cisco's newer 7970 IP phone sets. The latest CallManager also has been additionally hardened, along with the underlying Windows 2000 operating system, according to Cisco. For our tests, this meant that open ports were closed and unnecessary services disabled.

An impressive array of network self-defense features is included in the Catalyst IOS versions tested. Specifically, we had IOS 12.2(17b)sxa on a core Catalyst 6500, and IOS 12.1(20)ew on an access Catalyst 4500. These capabilities did more to thwart our assaults than any other component in the Cisco topology because they were the first line of defense. They include:

- Traffic policing and committed access rate, which were very successful in fending off our DoS assaults.

- Layer 2 port security, which restricts the number of media access control (MAC) addresses on a port.

- Layer 2 Dynamic Host Configuration Protocol snooping, which prevents dynamic host configuration protocol exhaustion attacks.

- Dynamic Address Resolution Protocol inspection, which stops ARP poisoning and ARP spoofing attacks. This, too, frustrated a number of our attack team's more insidious assaults.

- IP Source Guard, which prevents impersonation attacks.

- Virtual LAN (VLAN) access control lists, which restrict the traffic that can reach IP phones.

Cisco Security Agent (CSA) is a host-based intrusion-prevention system (IPS), and is now an integral security component in CallManager IP telephony servers. It was also on Cisco's Unity voice mail server and all other Win 2000 servers (seven CSA agents in all) deployed throughout Cisco's network topology. The CSA agent runs

automatically and unattended, and provides some powerful safeguards at the server, including:

- Buffer overflow protection, which protects the server's protocol stack from attacks involving malformed data packets.

- Network worm and Trojan prevention (not tested).

- Prevention of unauthorized application from running.

- Protection against synflood attacks — a family of DoS attacks against the server's TCP processing.

- Detection of port scans, which all hackers employ to determine vulnerabilities based on a server's responses to specific services and port numbers.

Bottom line

After three days, the attack team could not find a perceptible disruption to phone communications. We only had two minor concerns about the Cisco system as tested.

First, our hackers could readily insert a passive probe into an IP phone station connection. From that vantage point they could observe and collect full traffic details — protocols, addresses, and even capture RTP, which is the VoIP protocol that runs above UDP and carries all voice samples in all VoIP systems. VoIP streams to/from Cisco 7970 phones can be 128-bit encrypted, however. Our hacker team readily acknowledged that it could not hope to decrypt those streams.

Second, with the network information collected via the inserted probe, the hackers could insert their own computer, gain access to the voice virtual LAN and send traffic to other devices on the VLAN. They could not impersonate an IP phone or spoof an IP phone call, however. With all the other controls in place, they could not further exploit the system.

Achieving what Cisco did — orchestrating effective security across so many layers and platforms — is no mean feat. The subtle inter-relationships and correct setup of all these security pieces is daunting. But despite all the Cisco security experts on hand to tune, monitor and configure the various systems, we still uncovered configuration problems.

One of the firewalls as configured by Cisco was passing no traffic in either direction — which might be secure, but not very practical. Also a vulnerable service mistakenly was left running on one node. While these things, and others, were promptly fixed, the point is that even the best-laid security plan can be affected, even compromised, because of improper or incorrect settings.

Avaya, Part one

The first configuration Avaya submitted for security assessment had a minimal network infrastructure (see "Avaya no-frills VoIP security topology," left). In fact, there was no Layer 3 network infrastructure at all. All IP communications traversed a single, flat, switched Layer 2 network, segregated into two isolated VLANs, one for voice and the other for data. No firewalls were employed,

Ground rules for VoIP security testing

Before the test, these ground rules were adopted as a means of setting a level playing field for consistent testing practices across all vendors tested.

1. The vendor has complete control over the IP telephony environment and underlying network infrastructure — which products to include and how everything would be configured.

2. A midsize, local-only VoIP environment (campus or building) would be simulated. No VoIP traffic would be carried via WAN between remote, distributed locations.

3. After setup, IP telephony and Layer 2/Layer 3 data networking could not be functionally limited because of security settings, including normal IP phone calling out to/from the PSTN.

4. After setup, vendors could not actively manipulate or reconfigure their network. They could, however, continue to passively monitor security alert/alarm logs.

5. Assaults would all be attempted via these specific attack points:

- a. Via an "office-cube" data-LAN port, which the assailant can legitimately access (for example a valid MAC address).

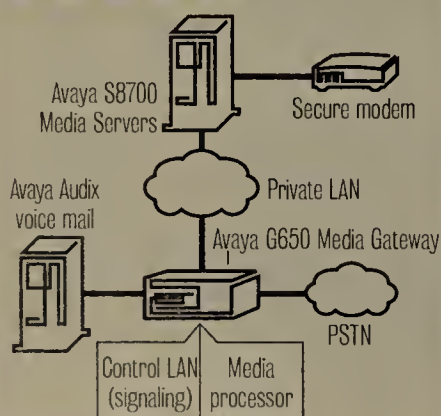
- b. Via an "office-cube" IP phone, which the assailant is authorized to use, including the "data switch port" on the back of the phone, for a desktop or laptop. These scenarios represent typical "insider-attack" scenarios.

6. All assaults would employ or be based on tools and attacks that are publicly available via the Internet. No new programming or other unique or custom attacks could be applied.

7. Assailants could not procure or disassemble and dissect a vendor IP hard phone.

Avaya no-frills VoIP security topology

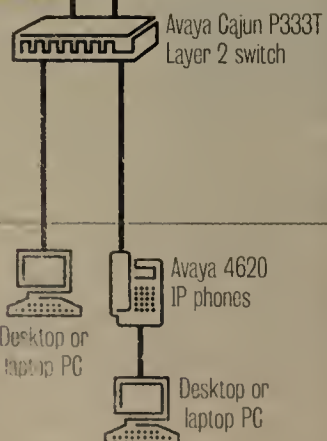
VoIP infrastructure



Key security components

- Private LAN separates call controller (S8700) from user network.
- Remote management is via secure modem link; not IP.
- Voice mail connected by analog trunks, accessible from public switched telephone network independent of IP network.

Network infrastructure



- IP management access to switch disabled (console access only).
- Separate voice and data VLANs; and no routed connectivity between voice and data VLANs.
- Switch "locked down"; media access control addresses, once learned, can't change.
- Media (Real-time Transfer Protocol stream) encryption supported on all IP phones (but call-control signaling is not encrypted).
- Static IP addresses for all IP phones and hosts.
- Password-based authentication of IP phones.

Despite this minimal network infrastructure, the Avaya VoIP package does feature various inherent security mechanisms. Consider the VoIP infrastructure, for example:

- Call control, in the form of a set of redundant S8700 Media Servers, connect the call control to a private LAN, which isolates and insulates them from the production network. The servers connect only to a specialized IP System Interface module, running Version 5 housed in the G650 Media Gateway chassis.

- Voice mail connects via analog trunks, which Avaya says is a plus when there are problems with or threats promulgating from the IP network. Even if all phones are IP, calls still can be received from the public switched telephone network and routed to voice mail, regardless of the state of the IP network.

- Rather than connect via the Internet, Avaya endorses a secure-modem connection for remote diagnostics and testing. But

See VoIP, page 86

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dreams made real

VoIP

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while this certainly avoids IP-based assaults, it hardly represents the state of the art in data networking or security.

- System software uploads involve a two-step process: The administrator downloads new software onto a laptop and then uploads the software from the laptop into the call-control system.

However, the Avaya topology call-control information is not encrypted, and the passwords used for IP phone authentication are not very strong.

The Avaya Cajun P333 switch does offer some security features. Those applied in our test environment were:

- For port security the administrator can lock down the port to one, two or three MAC addresses, once the switch has learned the MAC(s). This was applied in our environment, locking the switch port to one MAC. If a user moves with his PC to another location and switch port, the administrator has to manually release and then relock the switch ports. But because we readily could observe and record traffic on our data and voice links, we could have our hacker computer use a legitimate MAC address. The switch never knew the difference.

- Management-access restrictions, such as closing out all IP-based management access to the switch (Web and Telnet), allow access only via the serial console port.

- SNMP traps can be issued for VLAN violations and for any configuration changes.

Our hackers learned quite a bit by querying Avaya's IP phones via SNMP, using the universal default SNMP community name "public." But the phones could not be reconfigured, disabled or otherwise exploited via SNMP sets (writes).

Bottom line

Two of our attack team's main penetration and surveillance tricks that were successful in getting into the Cisco system worked equally well in this Avaya environment. The hackers could readily insert a passive probe into an IP phone station connection, and observe and collect full traffic details. VoIP streams to/from the Avaya 4620 IP phones also were encrypted. The hackers also could insert their own computers, gain access to the voice VLAN and contact other devices on the VLAN — but could not impersonate an IP phone or spoof an IP phone call.

The attack team then uncovered two serious vulnerabilities that could be exploited to disrupt voice communications.

One particularly effective attack involved just the IP phones. This was a fairly sophisticated, two-step assault. By sending a high rate of a particular traffic type to an IP phone for a few minutes, the phone in many cases would reboot. Rebooting made the phone susceptible to the second part of the assault, delivery of a handful of special packets, which disabled the phone for 20 minutes. Many phones could be disabled in this manner, one at a time.

By repeating the part-two packet stream during the 20-minute period, affected phones could be disabled indefinitely.

Other vulnerabilities were exposed, too, but time did not permit them to be fully exploited. One of these is that the switch data port on the back of Avaya's IP phone accepts and passes user traffic with VLAN tags appended. This makes the hacker's job easier. For example, the hacker computer could then plug in the back of the phone and start sending spoofed voice traffic — with the appropriate voice-VLAN tag; you don't even need to unplug the phone.

We also observed that certain traffic types sent to particular ports on the call-control equipment could increase the time it takes for calls to be processed. And in the hacker world, if you can cause it to slow down, it indicates a vulnerability that you can, with enough time, exploit to gum up the whole works.

Avaya, Part two

Avaya took home the lessons it learned from the first round and returned with a more hardened, more secure configuration (see "Avaya maximum-security topology," right).

Officially, Avaya says its IP-telephony package is switch-agnostic, with regard to the Layer 2 and Layer 3 equipment that underlies the VoIP infrastructure. So the Avaya Cajun P333 switch employed in the first test round was replaced in the second round with Layer 2/Layer 3 switches from Extreme, with which Avaya partners.

The key new components, all additions to the network infrastructure, included: an Avaya SG208 Security Gateway (\$15,000); an Extreme Summit 300-48 Layer 2/Layer 3 switch (\$8,000); and an Extreme Alpine 3804 Layer 3 switch (\$10,000). The Avaya VoIP equipment was unchanged. In fact, the same software loads were run in this retest, for the Avaya S8700, the G650 Media Gateway, the Control LAN (CLAN) and media processing modules, and even the same IP phone firmware release. The CLAN module ran firmware Version 9; the media processing module ran firmware Version 75, and the IP phone ran Version 2.0 firmware.

The Avaya Cajun P333 switch used in the first round was replaced with Summit 300-48. So, the frills necessary to shore up Avaya's security story in the second test round amount to about \$30,000.

Architecturally, the addition of Layer 3 IP routing and other key configuration changes prevented the type of attack that was developed in the first test round, where a rogue hacker computer directly assaulted other IP phones.

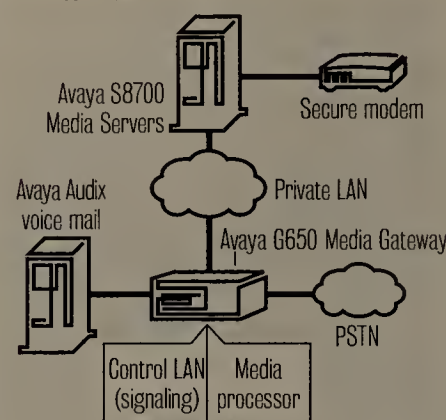
The changes that enhanced security were:

- Rate limiting of IP traffic by the Summit switch prevented any TCP/UDP or broadcast packet stream from exceeding 1M bit/sec.

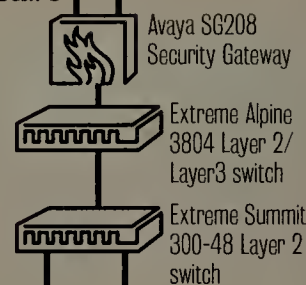
- Individual VLANs per IP phone port were set up. An IP phone cannot directly assault another IP phone if it is on a different VLAN. Then any traffic between phones has to be routed. And then it can

Avaya maximum-security topology

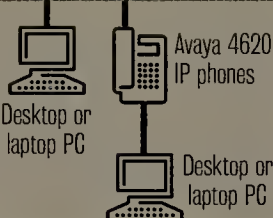
VoIP Infrastructure



Network Infrastructure



User access (office cube)



Key security components

- Private LAN separates call controller (S8700) from user network.
- Remote management is via secure modem link; not IP.
- Voice mail connected by analog trunks, accessible from public switched telephone network independent of IP network.
- No direct phone-to-phone VoIP (shuffling); all streams go through media processor.
- Firewall rules restrict access to VoIP infrastructure; local even logging.
- Each IP phone isolated on its own unique VLAN.
- Static media access control addresses "locked down" to port and VLAN; static Address Resolution Protocol supported.
- Summit Layer 3 rate limiting.
- Media (Real-time Transfer Protocol stream) encryption supported on all IP phones (but call-control signaling is not encrypted).
- Static IP addresses for all IP phones and hosts.
- Password-based authentication of IP phones.

be examined, blocked by protocol, even rate-limited, as noted. Managing per-port VLANs also can be an administrative nightmare, especially when IP phones number several hundred or more. So the scalability of this approach in large VoIP deployments is dubious.

- A process Avaya calls "shuffling" is disabled. Shuffling is the ability of an IP phone to directly exchange RTP voice streams with another IP phone. With shuffling disabled, all VoIP streams must pass through the media processing module. So disabling shuffling provides for good control and network security, but it makes the media processing module a bottleneck. An Avaya source says a media processing module can handle up to about 64 concurrent calls. So the scalability of this approach is questionable.

The Extreme Alpine can restrict traffic it passes to known IP phone MAC addresses. That means a hacker has to spoof a legitimate IP phone's MAC address to send traffic through the Alpine. That is exactly what our attack team did. The passive monitoring insert cable our team developed lets all active network addresses be seen and captured, even in this hardened Avaya configuration.

The SG208 firewall was configured to let only traffic of specific ports pass to and from the call-control equipment. Only traffic within a narrow, specific UDP port range was allowed to pass to the media process-

ing module, and only the ports and protocols associated with Avaya's H.323-based call-control signaling were passed to the CLAN module. It didn't take the hackers long, with straightforward techniques, to figure out which ports were open. Their surveillance confirmed that call processing was H.323, and that meant certain ports had to be in use. And using borrowed real-phone IP identities, they were able to contact the call-control infrastructure and get responses.

It is not necessary to emulate all aspects of a legitimate IP phone's operation, or even to know its password, for example, to

See VoIP, page 88

VoIP security special report

■ Miercom's recently released special report, 2004: A VoIP Security Assessment, includes detailed information on VoIP vulnerabilities overall, attack scenarios and how to best defend against them. In addition, Miercom's program of IP telephony and VoIP security testing is ongoing. Find out about the latest tests and results, including re-tests of vendors that have patched and otherwise addressed previously exposed vulnerabilities as reported at www.nwfusion.com, DocFinder: 2124.

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VoIP

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penetrate the call-control infrastructure. Full emulation of an IP phone's password, protocols and packet streams is necessary to place an unauthorized phone call. But most hackers have more sinister objectives.

Bottom line

As in the first Avaya test and the Cisco test before that, the attack team readily could insert its passive probe into an IP phone station connection, and observe and collect full traffic details but not decipher the encrypted voice streams.

Similarly, with the network information

they collected, the hackers successfully could insert their own computer and — using the MAC, IP and VLAN tag of a legitimate IP phone — gain access to the voice infrastructure and contact other devices within the VoIP infrastructure.

The attack that worked in the previous

test round against other IP phones no longer worked with this Avaya configuration. But the attack team did turn up another vulnerability. By issuing a very low volume of packets, using a specific protocol and port to the call-control equipment, IP phones could be prevented from registering. In normal circumstances this would affect just a small number of phones: An IP phone registers only when it's first plugged in.

So unless a phone was moved or unplugged, it normally wouldn't need to re-register. Still, phones could be prevented from registering for as long as the very low-volume traffic stream continued to be sent to the call controller.

Avaya determined that a software patch to its call-control software was necessary to address this vulnerability. The company committed to fixing the problem.

In the final analysis, and given the relatively minor nature of this security hole, we gave Avaya an overall resistant rating for this maximum-security configuration.

Conclusion

Our findings underscore a tenet of network security: Effective security has to address all layers. Cisco applied effective measures at Layers 2 and 3 (Catalyst switches), Layers 4 and 5 (firewalls and IPS), Layer 6 (RTP voice stream encryption, still limited to certain phones, though), and Layer 7 (with server-based software such as the Cisco Security Agent).

The first Avaya configuration had limited Layer 2 defenses and very few defenses at Layers 3 and above, except for Layer 6. To its credit, Avaya does have good RTP encryption (Layer 6) support on all its phones. Avaya's hardened, maximum-security configuration addresses Layers 3, 4 and 6 more effectively, but still left some holes.

VoIP security, spawned by the popularity and proliferation of IP telephony, is a critical issue, and we challenge other IP telephony providers to throw their hats into the ring.

Mier is a network technologist, consultant, author and founder of Miercom, a network product test center in Cranbury, N.J. Birdsall is senior test engineer with Miercom. Thayer is principal investigator with Canola & Jones, a security research firm based in Mountain View, Calif. They can be reached at edmier@miercom.com, rbirdsall@miercom.com and rodney@canola-jones.com, respectively.



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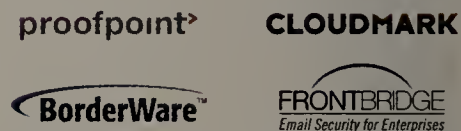
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Don't blame the network

Testing software before a rollout helps curtail finger-pointing about poor performance.

■ BY LINDA LEUNG

It's all too easy for users to blame the infrastructure when their access to corporate servers is slow. This is such old hat that at a recent company meeting, the network professionals at apparel retailer Gap showed off their own tongue-in-cheek creation — a song called "Blame the darn network." In turn, the network folks often blame the application developers for building code that hogs bandwidth and makes everything else run like a dog.

"The complexity of applications is growing, and developers tend [not to] understand the nuances of application behavior in the real world. Now so many applications are mission-critical and IT operations are having to do more with fewer people — this is putting tremendous pressure on the [network operations center] guys," says Dave Danielson, CEO of performance management vendor Altaworks.

Too often, software is tested in the confines of the software lab but not in the real world, where multiple networks, servers and clients could introduce scenarios that the application might not have been built to overcome.

The problem also could be cultural, Danielson says. Developers strive to write software quickly and efficiently, whereas the operations folks ensure the infrastructure is well managed and performs well. If their motives are different, how can the two groups provide services that are useful to their constituents?

Danielson says organizations need to foster a closer understanding of the focus and challenges of both teams. What's more, he recommends testing the application before unleashing it to end users. This process helps the network specialists ensure there's enough bandwidth for the software, and helps developers identify and fix weak spots in the software that could create problems on the live network.

Gap, for example, uses Opnet's IT Guru and Application Characterization Environment (ACE) network modeling tools to test new software before it's rolled into production, says Jerry White, senior network engineer at Gap in San Francisco. IT Guru models the network, including routers, switches, protocols, servers and individual applications, while ACE provides detailed analysis of application packet traces and quick diagnosis of problems.

IT Guru is used as part of Gap's Network Application Deployability Assessment program for testing software on a model network before deployment. Software managers and the network staff who will conduct the tests meet and discuss the application's

demographic, the number of users and their locations. "Once that has been determined we talk to the users to see what they want to get out of the study — is it response-time estimates? Mainly, it is 'Will network ops sign off on our application?'" White says.

White recalls a time when Opnet showed Gap business users that throwing more bandwidth at a problem might not always be the right answer. The retailer rolled out a pilot at 19 branches in which sales associates could place customer orders from Gap's online store using the browser on a cash register. Because the response time after a mouse click could be as slow as 45 seconds, the team responsible for store systems wanted to upgrade the 56K bit/sec connection between the store and the site.

A quick model using ACE of a typical transaction using 128K and 256K bit/sec connection speeds found that the faster networks would only shave 5 seconds off the current time. By using the model, White and his colleagues identified that the delay was caused by large transaction sizes and slow processing times of the cash register and server at the online store. The company didn't change the setup because traffic volumes were low and the performance increase wouldn't justify the cost.

"Our data center is in Rocklin, Calif., and we have users in Asia and Europe. We can't throw a ton of bandwidth at problems," White says. "The ACE reports give users choices — this is what would happen if we upgraded the bandwidth. The reports help them set their own performance expectations. Could they put up with low response times, or do they want to spend the money and upgrade?"

White says the entire testing process — from first meetings to the issue of a report — takes about 40 manhours, much less than the 200 to 400 manhours that Altaworks' Danielson says some companies spend solving brownouts. Danielson knows of a Midwest insurance firm that has a SWAT team of seven types of IT specialists who trace performance problems on the live network instead of testing the network and applications at the pre-production stage.

But sometimes it's still necessary to troubleshoot during production. White recounts an occasion when users at Gap headquarters suffered intermittent delays when accessing an application service provider (ASP)-hosted CRM application. The users connected to the ASP's data center after passing through a proxy server at Gap's data center.

"We used IT Guru to capture the application stream, and we found some interesting things. The application was a giant Java script, and the processing power of the clients was slow," White says. "Users wanted to blame the proxy server but once we ran tests we found that it was not inducing delays."

Gap fixed the problem by upgrading the slower client machines to 2GHz, setting users' browsers to use HTTP Version 1.1 and adding bandwidth.

He says the testing tool has been helpful in preventing the finger-pointing between users, applications development staff and the network operations specialists. But he thinks it would be even better if network professionals had more application knowledge. "If I knew what the application was doing, I could make recommendations, rather than just give them raw data. We could then be far more effective," he says. ■



Jerry White, senior network engineer for Gap, eyes network modeling tools to show users that big bandwidth doesn't always make apps run better.



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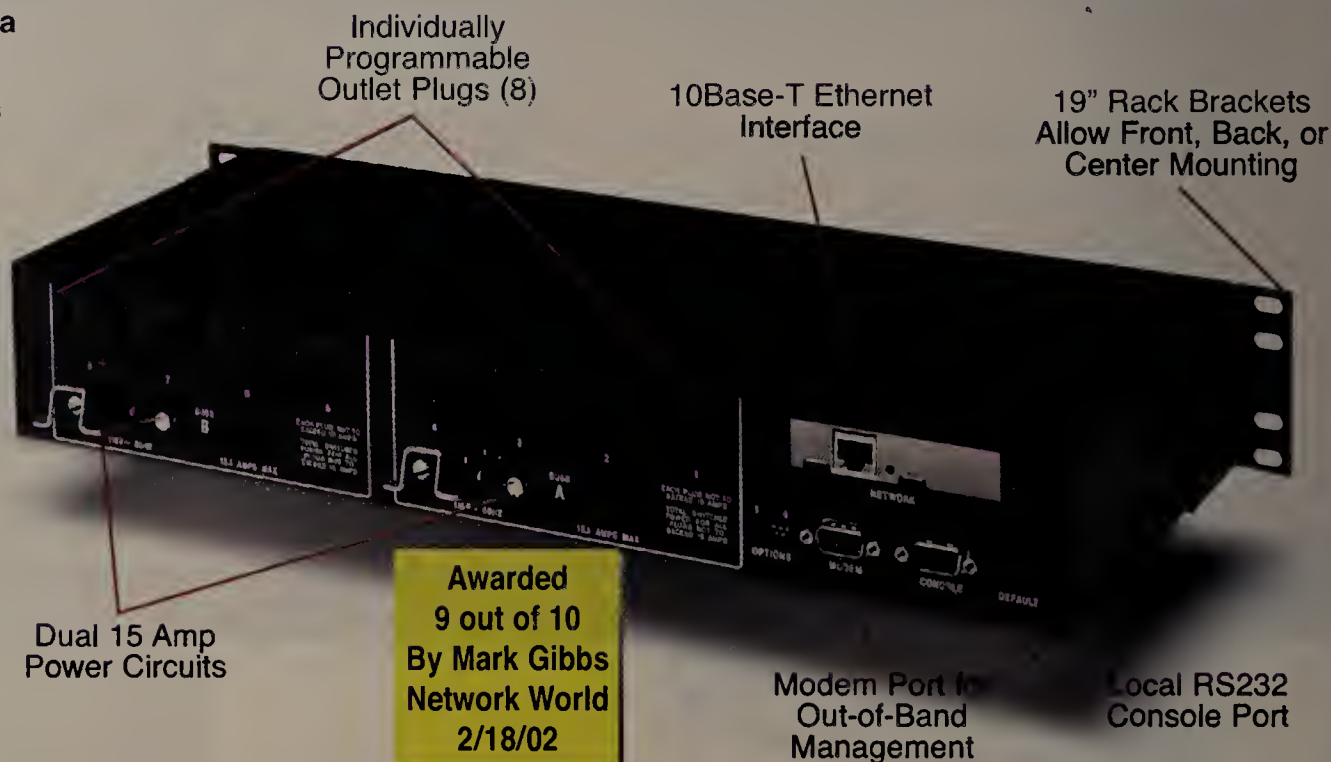
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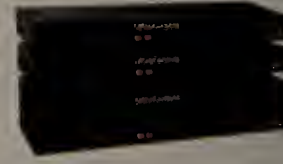
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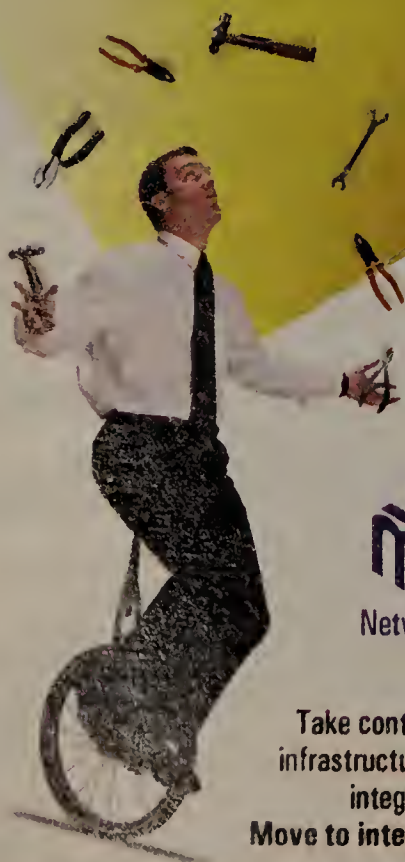
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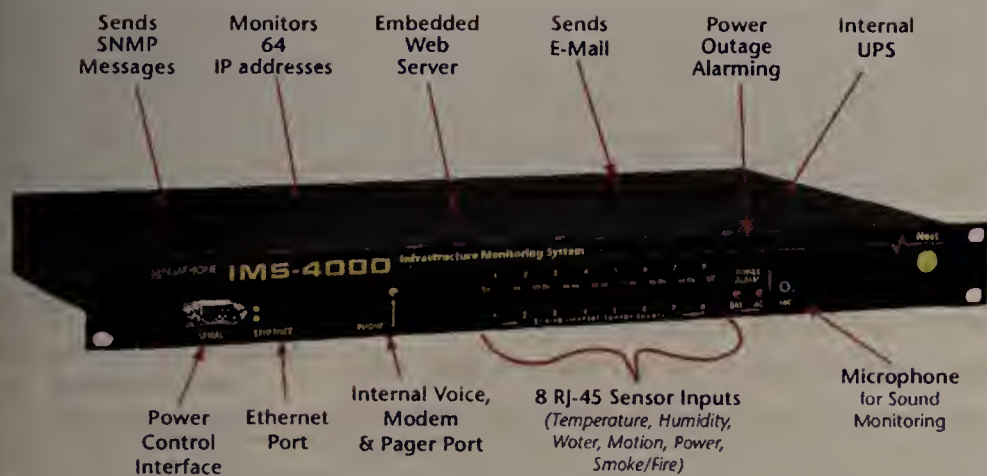
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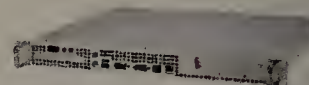
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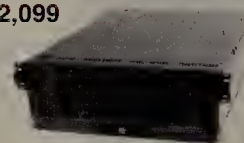
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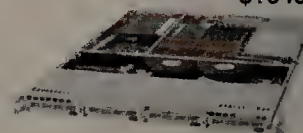


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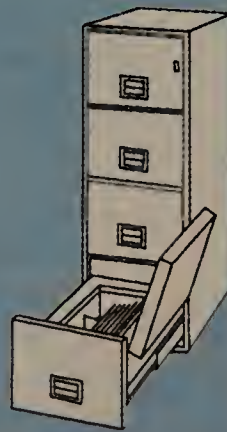


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IT Careers: The Job Picture

This is the first of two articles that IT Careers will publish in cooperation with the Information Technology Association of America (ITAA) studies on 2004 job outlook and specifically the software development job category.

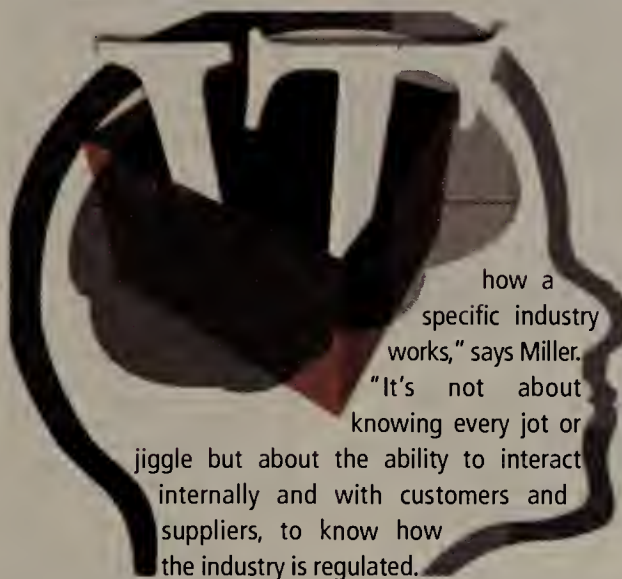
While the information technology industry sector plunged from 2000 to 2003, international events created an increasing awareness that software development and technology infrastructure are critical to the nation's security and global economic leadership. That was the focus of the recent National Software Summit, where participants tackled infrastructure trustworthiness and adequacy of current software research and development, but also maintaining the world's leading software workforce.

Harris Miller, president of ITAA, worked with a team of leaders from IBM, Northrop Grumman and Microsoft as well as academia, to address the workforce issue and present findings at the summit. Key among the findings of the team were:

- After a three-year slump, technology hiring is going up.
- IT workers need to be able to navigate across the economic range of opportunities, not just in technology companies.
- There's a need to prioritize the most important and credible certifications for hiring clarity.
- Creativity and imagination – the ability to “think outside the box” are in high demand.

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“Hiring managers will view a straight technology worker as not being as valuable as one who understands the business model and



In the past, these skills were required only at the top end of the (IT) profession.” ITAA's Global Outsourcing study found that the technical-only skills are most easily outsourced; the complexity of applying technology to create new business growth and opportunity is more valued and less likely to be outsourced.

One of the most difficult skills to speak about in job interviews is the “think outside the box” ability. Miller says the best way to do this is for job candidates to explain to hiring managers an actual experience where they looked beyond the visible problem or challenge to create something much more valuable. “For instance, if you were asked to perform a maintenance update but along the way found that there was a better approach to integrate databases that had been stovepiped – that's an example of this thinking. It's what will differentiate you from the other 500 people who have applied for the same job.”

The team did note that there is more focus on IT professionals having more than one major area of study to complement technical skills. “Everyone is talking about it,” Miller says, “but it is not yet a dominant trend. Most companies, when running an ad to hire someone, run the same kind of ad listing technical skills. Companies on the cutting edge are trying to break into new areas of business and they're listing a broader set of capabilities required.”

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MAINFRAME ANALYST/PROGRAMMER: Writes, updates, maintains programs written in COBOL/CICS for mainframe and financial services clients. Creates/maintains IDMS/R databases. Reviews work flow charts development by system analyst/programmers to understand how program should access data. Writes physical database description to protect it from unauthorized access and tampering. Provides technical support and guidance for COBOL systems. Coordinates changes in computer databases. Reviews changes in physical design of databases to assess effect on physical databases. Establishes computer access level for each segment of database. Specifies user access level for retrieval, modification, deletion. Conducts quality control testing on codes and correcting errors. Enter codes to create production databases and utilities programs to monitor performance of database. Modifies data in fine-tuning database operations. Generates prototype for potential clients to visualize applications. Job is in Miami, FL. 40 hrs. weekly, 9-5 pm. \$61,000/yr. Bachelor's degree or equivalent, based on education or experience in Computer Science or related field plus 2 years experience in job offered. Mail resume to: SMX Services & Consulting, Inc., 7220 NW. 36th St., Suite #421, Miami, FL 33166. Attn: Amneris Hampton.

SQL & Web Engineer wanted to develop & architect solutions for internal customers using company structured methodology, 3-tier architecture & one of the following technologies: Lotus Script, Lotus formula language, ASP, COM+, VB; develop clear, concise & professional tech. & user documentation; lead & perform the Bus. Analysis phase of projects incl. Reqt. Analysis, High Level Design, Workflow Analysis & Design, Info. Flow Analysis & Design; effectively estimate solutions design & implementation for projects using accurate time estimates; provide tech. support to client & IT mgmt. to ensure develop. of efficient application systems utilizing established standards, procedures & SDLC methods; act as a point of contact for customer engagements; assist w/develop. of proposals; integrate disparate systems for various internal depts.; admin., maintain & upgrade the 3rd party 'Perception' Online Training Server & all other 3rd party solutions; maintain & upgrade web App. templates using co. templates; maintain & upgrade Microsoft IIS Web Apps. & Lotus Workflow Systems. Must have Bach. deg. in Comp. Sci., Eng., or related field & 2 yrs. exp. developing data-driven web apps. on MS & Lotus platforms, including exp. w/ASP, VB, Lotus Script, Lotus Formula Language, & Lotus Notes/Domino Development. 40 hrs/wk. Salary \$70,000/yr. Send two resumes to Case No. 200300027, Division of Career Services, Labor Certification Unit, 19 Stanford Street, 1st Floor, Boston, MA 02114.

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ACS State and Local Solutions has a current opening in its Rockville, MD, office for a Senior Product Manager, VECTOR.

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This position requires a Bachelor's in an Engineering or Computer Science discipline, 6 years of combined experience in managing software development teams, product definition and architecture and leading the planning and management of software products. Prior experience must include at least 6 years of direct experience leading the development of technical solutions for the Electronic Toll Collection (ETC), Call Centers, and Financial Processing/Settlement industries.

To be considered for this position please go to www.acs-inc.com, Career Opportunities, Current Openings, Rockville, MD, and click on Senior Product Manager, VECTOR, SL-TSS-TCC 22089, to apply on-line.

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SAP Senior Consultant

GlaxoSmithKline, Research Triangle Park, NC. Provide expert second line support using business process and Production Planning, Execution, and New Product Introduction ("PP/ PP-PI") application knowledge for pharmaceutical company. Solve complex and original problems and provide expert technical guidance on PP/PP-PI processes. Carry out detailed impact assessments for proposed change requests, propose alternative cost-effective solutions where appropriate and lead, evaluate, develop, test and arrange release of development according to GSK validation procedures. Work with other functions to identify opportunities for process improvement and assist in the implementation of those agreed. Req.: Bachelor's or foreign equivalent in CS or Engineering. 3 years of experience in job offered or as SAP Consultant. Following experience, which may have been obtained concurrently: 3 years of experience in Production Planning, in specification and configuration of SAP (incl. version 4.6) and in SAP development in PP/PP-PI areas; 2 years of experience in the pharmaceutical industry; and 2 years of experience in the selection, configuration, implementation and maintenance of PP/PP-PI systems.

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Sr. Network Consultant sought by software consulting company in Denver, CO to work in Cupertino, CA and other unanticipated job sites in the U.S. to, at a senior level, be responsible for network development, installation, testing and administration. Analyze user requirements for network bandwidth and security for Local and Wide area networks. Develop network architecture for Cisco networks based on Ethernet, Gigabit Ethernet, ATM, Packet over SONET (PoS) and Frame Relay using Cisco routers, Switches and Firewalls for Local and Wide Area Networks (LAN & WAN). Develop and implement routing protocols such as Open Shortest Path First (OSPF), Routing Information Protocol (RIP), Enhanced Interior Gateway Protocol (EIGRP) and Border Gateway Protocol (BGP) for routing Transmission Control Protocol and Internet Protocol (TCP/IP) in large LANs and WANs. Create and implement plans for network security. Provide training and support and engage in project management as required. Requires master's or equivalent in Electronics and Communication or related field; specifically requires master's degree or foreign equivalent or a bachelor's degree or foreign equivalent plus 5 yrs. exp.; 2 yrs network administration experience, working knowledge of Cisco networks, EIGRP, OSPF and frame relay. The 2 yrs network administration experience may be concurrent with the 5 yrs required for the master's. M-F, 8am-5pm; \$75,000/yr. Respond by resume to Employment Programs, PO Box 46547, Denver, CO 80202 and respond to JON C05077643.

Chief Operating Officer. Direct the Management of German owned subsidiary company specializing in the development, customization and implementation of Customer Relationship Management ("CRM") systems; direct corporate operations, including strategic planning, CRM systems development and implementation, quality control and client development and relations; and serve as Chief Liaison with German parent company responsible for preparing reports in German on US corporate and financial operations, strategic planning and profitability for German executives, owners and Board members. Must have a Master's degree or foreign equivalent in business administration with a concentration in computer science or a related field and six years of executive or managerial level experience managing software systems development, or a Bachelor's degree and eight years of experience as stated. Experience must include at least 2 years of executive-level experience directing corporate operations of a software company with annual revenues exceeding \$10 million.

Vice President of Professional Services. Direct the Management of the design, development, customization and implementation of multi-million dollar Customer Relationship Management ("CRM") systems from pre-sales through post go-live support, including technical systems specification, project planning, pricing and contract negotiation and client relations; manage CRM Project Managers, Engineers and other technical support staff, providing technical guidance to development and implementation teams in the US and Germany; serve as Chief Technical Liaison to German Parent Company, responsible for co-development of systems solutions and training of US staff on systems developed in Germany. Must have ten years of executive or managerial level experience managing software systems development. If interested, submit resume in duplicate to:

Ms. Cassandra M. Stewart
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Office Manager
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Atlanta, Georgia 30328

Software Engineer - InterContinental Hotels Group is seeking qualified applicants for positions at the company's North American headquarters in Atlanta. Develop real-time revenue management applications for use in multi-platform environment. Requires relevant degree and experience with revenue management systems for hospitality/tourism industry. Apply to Francene Taylor, Six Continents Hotels, Inc., Three Ravinia Drive, Suite 100, Atlanta, Georgia 30346.

Software Engineer to perform sys lvl prod testing, which includes network comm. & connectivity tests; equipment initialization & setup tests; sys. integration, & component lvl functional tests; user interface testing; regression tests; & version compatibility tests; perform prod design, sys analysis & prog activities. Bach in CS/EE/related field + 4 yrs exp + knowledge of SQA concepts and telecomm standards (SS7, TCAP, ISUP, IS41P, IS826 & IS771) + exp w/ scripting languages (Bourne, Shell, C-Shell, Perl, C++) req'd. Forward 2 resumes to Lightbridge, Inc. 320 Interlocken Pkwy, Broomfield, CO 80021, Attn: Pat Jensen. Job # 1465.0051.

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Senior Engineer (Portland, OR): Develop & implement introspective & self-adaptive hardware & software systems. Design, implement, & evaluate new program representations. Consult w/ teams & clients to enhance reliability, scalability & performance of advanced computer system. Supervise project team & engineers to devise solutions. Min. req's: Ph.D. in Comp. Sci. or Elec. Eng. Plus 1 yr. specialized experience. Send resume to: Melanie Peters, Business Manager, Reservoir Labs, Inc., 632 Broadway, Suite 803, New York, NY 10012.

S/W QA Engineer to perform s/w component/app testing, including functional testing, installation testing, integration testing at the component level, stress/load testing at the application level, user interface testing, patch testing, documentation testing, & performance testing at the component level. Must have Bachelor's in CS/EE/related field + 2 yrs SQA exp + knowledge of SQA concepts + test automation incl Winrunner & Test Director + exp w/ scripting languages, w/ installation of Oracle DB, and w/ telecomm protocol. Forward 2 resumes to Lightbridge, Inc. 320 Interlocken Pkwy, Broomfield, CO 80021, Attn: Pat Jensen. Job # 1465.0080.

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Software Engineers needed in Milwaukee, WI. Seeking candidates possessing MS or equiv. and rel. work exp. Duties include: Analyze, design, develop, implement and test software applications. Exp must include 2 years working with RDBMS. Mail resume, ref and salary reqs to: Systems People, Inc., 1200 New Rodgers Road, #C7B, Bristol, PA 19007.

McData Corp. seeks applicants for the position of Software Engineer in Sunnyvale, CA to design and develop software for data center storage switches that allow connectivity between hosts and storage devices. Requires bachelor's in computer science; 2 yrs exp working as a software engineer in Fibre Channel and SAN technologies; working knowledge of Fibre Channel protocol, protocol ASICs, operating system internals and writing device drivers (for LINUX or any flavor of UNIX). Respond by resume to Peter Whittle, McData Corp., 380 Interlocken Crescent, Broomfield, CO 80021 and refer to JON4.

ENG. Jr. Software Engineer. Assist in writing computer programs that translate system codes/spec of CDR, CDRW DVD+R, +RW, ROM & RAM Drives. Generate specifications for user appl. Assist in prototyping, refining, testing & debugging. Req: Bachelor's in Comp Sci/Comp Eng. 40 hrs/wk. Job/interview site. Anaheim, CA. Resume to: Digital Peripheral Solutions, Inc. @ PO Box 27684, Anaheim, CA 92809

Programmer/Analyst, Washington, DC. Assist Team Leader in EAI project architecture elaboration, design & development. Designing processes based on automatic UML models translation & code generating. Req'd. B.S.C.S & 2 yrs exp including exp in J2EE, XML, Oracle, MS SQL, UML, IBM Web Sphere, Code generators. M-F, 40hrs/wk. Send resume to S. Arsenyev, EastBanc Technologies, LLC, Ref. #99A1,3307 M Street, N.W., Suite 200, Washington, DC 20007.

PROGRAMMER/ANALYST

Plan, develop, test, document computer software using XML, JSP, EJB, JDBC, ASP, VB6, COM objects, XSL, Java Servlets, JavaScripts, DHTML, Linux, CSS, WebLogic & WebSphere w/ORACLE & SYBASE db's in Win & Unix enviro. Bach degn & 2 yrs exp reqd. Send resume to:

HR Dept., Fulcrum Logic, Inc.
Short Hills Plaza
636 Morris Turnpike, Suite 2J
Short Hills, New Jersey 07078

COMPUTERS - Software Engineers needed. Seeking qualified candidates possessing MS or equiv. and/or rel. work exp. Part of the req. rel. exp. must include 2 yrs. working with MS Visual Interdev & Visual Basic. Duties include: Design & develop call center/CRM software solutions; Plan & architect multi-tiered native & web applications; Work with Borland Delphi, MS Visual Studio.NET, Visual Basic, ASP.NET, MS Visual Interdev, Crystal Reports & SQL Server. Knowledge of 'C' desirable. Fwd. resume & ref. to: Sigmaworx, Inc., Attn: HR, 1515 Kimberly Rd., Davenport, IA 52807.

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Midwest Toxicology Services, Inc.
H.R. Manager
603 E Washington St., Suite 200
Indianapolis, IN 46204

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Systems Analysts (ERP/Financials): Analyze, design & administer enterprise applications and systems including financials/transport Admin./Mgmt. in Lawson Apps. (Financials/Admin.), Oracle, SQL Server, Unix, AS400, COBOL, VB. For complete job description or to apply, send resume/contact HR/IT-SA, URSI, 10701 Middlebelt Road, Romulus, MI 48174. No phone calls please. Principals only. EOE.

Systems Engineers needed. MS/BS or equiv. or rel. work exp. Part req. rel. work exp. must include 3 yrs working w/ Oracle, Weblogic, & XML technologies. Duties include: Design, configure, program & implement ERP & web based systems; Develop standardized methods, tech. & protocols for data comm. (incl data mapping); Provide tech. expertise for customer system integration & end-to-end partner testing. Work w/ Unix, Java, J2EE, JDBC, C++ Oracle 8 (& above) Weblogic, Web-methods, EDI & XML. Send res., ref., & sal. req. to Attn: HR Elemica, Inc., 1200 Liberty Ridge Rd., #120, Wayne, PA 19087.

Engineer (New York, NY): Develop/implement introspective & self-adaptive hardware & software systems. Design, implement & evaluate new program representations. Consult w/ engineers & clients to enhance reliability, scalability & performance. Design systems & techniques to map applications on architectures. Must have M.S. in Comp. Sci. or Elec. Eng., plus 1 yr. specific experience. Send resume to Melanie Peters, Business Manager, Reservoir Labs, Inc., 632 Broadway, Suite 803, New York, NY 10012.

Dot Hill Systems seeks applicants for the position of Principal Firmware Engineer in Longmont, CO to engage in design and development of software for network-based storage technology devices with embedded operating systems that utilize SCSI commands and protocols. Specify, design, develop and analyze Cache and RAID (RAID level 5, 5+0, 1, 1+0) software algorithms and Failover and Failback software algorithms. Position requires 6 yrs exp performing the duties and using the technologies above. Respond by resume to Eileen Jonikas, Dot Hill Systems, 7420 E. Dry Creek Parkway, Longmont, CO 80503.

Seeking qualified applicants for the following positions in Orlando, FL: Senior Programmer Analyst. Formulate/define functional requirements and documentation based on accepted user criteria. Requirements: Bachelor's degree or equivalent* in computer science, engineering, MIS or related field plus 5 years of experience in systems/applications development. Experience with C and/or C++, Java and UNIX also required. *Master's degree in appropriate field will offset 2 years of general experience. Submit resumes to LaWanda Thompson, FedEx Corporate Services, 1900 Summit Tower Blvd., Suite 1400, Orlando, FL 32810. EOE M/F/D/V.

Computer: Programmer Analysts needed. Seeking qualified candidates possessing BS or equiv. and/or rel. work exp. Part of the req. rel. work exp. must include 2 yrs working w/ C++. Duties include: Develop & test programs and software according to client projects; Perform regression, GUI & Functional tests. Work with C++, Oracle, PL/SQL, & Java. Send res., ref. & sal. req. to: Software Galaxy Systems, LLC., 1703 Dahlia Cir., Dayton, NJ 08810.

Programmers needed. Seeking candidates possessing BS or equiv and 2 years rel work exp. Our company will accept 1 year of post baccalaureate experience in lieu of 1 year of required years of experience. Duties include: Develop, modify and maintain programs using Microsoft Visual Studio.NET, C#, Java, SQL Server and other advanced technologies. Mail resume, refs and salary reqs to: Digital Designs, 1501 Charlotte Ave., Monroe, NC 28110.

Multiple positions available for integrated credit card services company. Seeking Development Mgr. & Sr. Team Leader. Positions require M.S. in Comp Sci. plus 1 yr exp or alternatively B.S. plus 5 yrs exp. Must include VC++, MS-SQL, Stingray. Send resume to Dynamic Currency Conversion, Inc., P.O. Box 1047, Nyack, NY 10960

PROGRAMMER ANALYSTS for Chicago, IL office. Design & Develop software applications using Oracle, Sybase, XML, Coolgen, Interwoven, ClearCase, ClearQuest, Plumtree, ITS, PVCS, UNIX. Bachelors or Equivalent req'd in Computers, Engineering, Math or any related field of study + 2 yrs of related exp. 40 hrs/wk. Must have legal authority to work permanently in the U.S. Contact HR Manager, Regency Technologies, Inc., 3130 N. Lake Shore Drive, # 1200, Chicago, IL 60645.

Application Developer req'd for s/ware Co. in Boston, MA. Duties: SystemStudy, development, design, review, rewrite, test & update application for web based learning & implant s/ware as per spec using JDK, JSP, Servlets, EJB, JDBC, Swing, Visio, Websphere and Weblogic. Knowledge in Adaptive Learning Theories, Instructional Design, SCORM 2004, IMSQTI, XML/IEEE, AICC Compliance is a must. 2 yrs exp as programmer or in field & Bach reqd. 40 hrs/wk, 9a-5p. Resumes to: IDL Systems, Inc., 60 Mass Ave. Boston, MA 02115.

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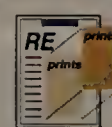
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AT&T's wireless deal with Sprint raises eyebrows

■ BY DENISE PAPPALARDO

While latching onto Sprint's wireless network might plug a glaring gap in AT&T's

consumer and business offerings, industry experts are questioning whether Sprint gets enough out of the deal.

AT&T will offer customers mobile ser-

vices that will be bundled with its existing local, long-distance voice and data services over Sprint's wireless network. The two companies last week inked a five-year, non-

exclusive contract. Financial details were not divulged.

The arrangement will let AT&T become a mobile virtual network operator (MVNO), which the carrier says gives it more operational control than simply reselling services. AT&T will provide customer service, billing and landline network support. All wireless long-distance voice calls will be handed off to AT&T's landline network with the exception of any call destined for the Sprint PCS network.

The telecom giant has not offered wireless service since it divested AT&T Wireless in 2001.

But one analyst wonders if Sprint made a mistake in embracing a competitor.

"How many times can Sprint [sell] itself out . . . and still succeed?" asks Bob Egan, president of consulting firm Mobile Competency. AT&T is Sprint's biggest competitor for business users, and it just handed them the keys to its one differentiator, its wireless network, he says.

Egan points out that Qwest and Virgin Mobile both operate their wireless businesses off of Sprint's network as MVNOs.

But if not Sprint it would have been another provider teaming with AT&T. Recently AT&T has been reselling AT&T Wireless services to customers in Atlanta; Austin, Texas; Baltimore; Indianapolis; San Diego and Tampa, Fla., but only on a trial basis. An AT&T spokesman says the carrier is using this information to formulate how it will introduce wireless services to its base of about 35 million consumer and 3 million business customers.

But before the carrier starts rolling out new product offerings it is waiting out Cingular Wireless' \$41 billion acquisition of AT&T Wireless. "There are market restrictions and other considerations that . . . preclude [AT&T] from competing against AT&T Wireless with an AT&T-branded offer," until after the deal closes sometime in the fourth quarter, the spokesman says.

The AT&T Wireless brand name will become exclusive property of AT&T six months after the deal closes, although AT&T says it is premature to say it will use that brand.

AT&T's wireless service rollout will happen "beyond late this year," a spokesman says.

AT&T likely chose Sprint because it has the most experience in handling MVNO arrangements, says Phil Redman, an analyst at Gartner.

"Sprint allows people to plug into their switches . . . to assess traffic and calculate billing," Redman says. There aren't many providers that allow that, he says.

AT&T also says it's in "active discussions," with other wireless service providers. ■



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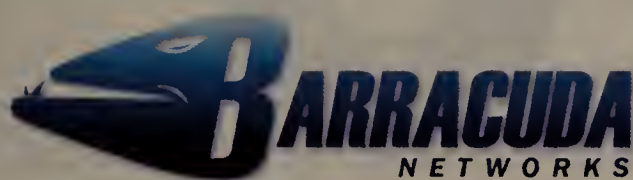
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Q&A

Elmer

continued from page 16

that. The government has anted up more money for this and we've seen the lion's share of that.

What projects is BBN working on that might interest network executives?

One area we're actively working in is a way of tracking back a packet after it arrives at its destination [formerly referred to by the suspicion-arousing name of Source Path Isolation Engine, or SPIE]. We look at which routers the packets touched to figure out where they came into your network. This could be for big companies and government agencies that own their own networks. It was developed originally for DARPA, and we're pursuing other government applications now. The key is being able to con-

dense this astronomical flow of data through routers into a small enough thing that you can actually fit a buffer in memory of the last five minutes or so. It uses very clever hash coding.

We also have patents in the works for automated ways to determine when worms or viruses become active in your network. They operate on fairly general principles and use the same hashing technologies that the IP traceback does.

What's your take on network security? Are things going to get much worse before they get better?

There are clever people who like to poke holes in things, and one of the things that makes it easy for them is that there is so much of one platform. It is almost irresistible to them world-wide to go and mess with it. There's a lot of religious discussion internally about whether one operating system is intrinsically more secure than others, but it's hard to separate out

whether one is more secure or not from the fact that one is just more prevalent and thus attracts more attacks. We're great believers in diversity of computation. We use very general protocols and stay away from single-vendor solutions. People here have Microsoft, BSD, Mac and Linux boxes, and they co-exist. That gives you much greater intrinsic robustness against attack than if you have a monoclonal solution.

BBN's contributions to packet switching and e-mail are well known. What's next for BBN and the 'Net?

We still participate in the IETF and write RFCs fairly regularly. But the Internet is so huge now that we don't have the central position that we used to, and no one ever will again. We're still pushing technology forward, but it tends to be more for special things like wireless and security. There's also the semantic Web, which is not the Internet per se but it's probably the next wave

of major applications atop the World Wide Web. We're very active in that and have written a lot of what have become key protocols in that area. In the next few years that will become

a very powerful way of communicating. You'll have agents buzzing around doing things instead of everything being designed for humans to look at, which is really a limiting thing. ■

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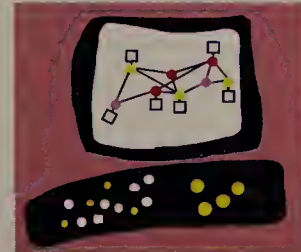
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BackSpin Mark Gibbs



Just say no (receipt)

For those of us who do business by e-mail — which is most of us — e-mail is an addiction, it has a drug-like quality that keeps you coming back for more — one hit a day is never enough.

Every now and then I swear I will just check my mail only a couple of times each day. Then I switch off the sound I use to tell me new messages have come so that the lure of “incoming” is minimized.

It never works. In next to no time my compulsive checking habit cuts in and I am back to looking in my in-box three or four times per day. In next to no time I’m switching on the “you’ve got mail” sound. Then I’m back to handling my messages in real time.

This mania to keep up with e-mail is something most of us geeky types have in common, and along with this compulsion often comes the overwhelming desire to know that our messages really get to their destinations. Some people send you a message only to chase it with a follow-up message 10 minutes later and then a telephone call one hour after that to check that their first message arrived. Ugh.

And then there are the people who select that their messages should have “receipt request” and

“read request” enabled.

My e-mail client is set up to always ask me if a receipt should be returned and, on principle, I always deny it.

My reasoning is thus: If you request a receipt and I have a relationship of some kind with you, I will honor the request unless I deem a receipt unnecessary (for example, you sent me a joke) or if I’m feeling grumpy (not unusual).

But if I don’t have a relationship with you then it’s a crap shoot: snake eyes, no receipt ever; pair of sixes, a receipt; anything else, good luck.

What if your message doesn’t get to me because it gets trashed en route? Well, if you do not get a notification from a mail server that handled the transaction, tough luck: It is not my responsibility to make the Internet reliable for your use — unless you are willing to pay me to do so. And if the message should get swallowed by an anti-spam filter, well, that’s just life — try resending with something less spam-like.

Now this desire to have receipts and reads confirmed has gained a new angle with a system called DidTheyReadIt, which you can find, you guessed it, at www.didtheyreadit.com. In effect this system equips e-mail so that you can find out when the recipient opened the message (or more accurately, when the recipient rendered HTML con-

tent) along with a number of other bits of data about the person, their browser and their approximate location.

But my question is: Do you really need this level of confirmation or amount of detail? How many messages do you send and receive that are really critical? Face it, if there is a real need for confirmed delivery, you would be crazy not to use the phone!

Plus, there’s the issue of privacy.

Do you really want every message received by you to provide the sender with any greater level of knowledge about you than they absolutely need to have?

Nope, the amount of information that we already give away — much of it unwittingly — is usually far more than is a good idea. Anything that increases the exposure of our information and makes e-mail less compelling for the business world is not a good idea. So when that read receipt request pops up, just say no. As for DidTheyReadIt, see Gearhead next week.

Give nothing away to backspin@gibbs.com.

(If you’re going to be at the Inbox Conference in San Jose next week come and join in sessions S7 and S8 on June 2, which I will be moderating.)



Net Buzz News, insights, opinions and oddities

By Paul McNamara

Pumped up about Gasbuddy.com

Paid two bucks a gallon for gas the other day . . . first time. And while I

know many of you have suffered this indignity for a while, the experience tested my stoicism about the ebb and flow of prices at the pump.

It also made all the more satisfying my first trip to www.gasbuddy.com, a site that has seen traffic skyrocket from 30,000 to a half-million daily visitors since January, according to co-founder Jason Toewes.

A nonprofit outfit that boasts 174 affiliated Web sites, Gasbuddy uses a roster of 110,000 volunteers to keep motorists abreast of the best gas deals available where they live, no matter how miserable those deals may be these days. The spotters report price information about the stations they pass in their travels, with some actually going out of their way to gather prices much as bird watchers seek rarities. The resultant database lets visitors see at a glance which stations near them are charging the least and most, a spread that can reach 20% within a few blocks, according to Gasbuddy. (A similar commercial site, www.gaspricewatch.com, does much the same thing.)

The gas-price watchers are prime examples of a growing Web site trend that enlists armies of like-minded volunteers to collect information about this or that and present the results online for amusement, social good and perhaps a shot at business profit.

The New York Times recently profiled an oddball example — www.payphone-project.com — that pairs up the physical locations and numbers of a half-million pay phones, information the telephone companies refuse to make public and the public apparently finds useful in ways both trivial and dramatic. Another I stumbled across last week — the National Incident Notification Network — enlists owners of police and fire scanners to scoop the press by reporting car accidents, plane crashes and other neighborhood carnage to

www.ninn.org the moment it crackles across emergency channels.

The gas sites are clearly more practical, of course, especially given the current run-up in prices.

On my visit, Gasbuddy had prices for several of the stations I frequent. One had the highest prices in my region, while the other had the second-lowest. Guess which one is more likely to get my future business?

Utility aside, it seems to me that volunteer-dependent sites of this nature are ripe for producing erroneous data, both of the accidental and fraudulent varieties. However, Toewes insists that Gasbuddy has mechanisms in place for flagging both and doesn’t hesitate to ban shady operators from posting prices.

Yes, I understand that gas prices today are not historically high when adjusted for inflation, but they’re plenty high enough to annoy. So why pay more when another station down the street is charging less and all it takes to find the bargain is a mouse click or two?

Heck, yes, I’m glad to be back

People mean well, of course, but the question — “Are you glad to be back?” — started to strike me as amusing after about the fourth or fifth instance.

A month and a half ago, a surgeon cracked open my chest and yanked an egg-sized tumor off my heart. The tumor turned out to be benign, but coming as this did on top of my December heart attack . . . well, you might understand why being anywhere other than a hospital bed would be cause for obvious joy.

But before we settle back into our weekly conversation about more mundane matters, I’d like to thank my colleagues Adam Gaffin and Melissa Shaw for so ably filling this space in my absence. And many thanks, as well, to those of you who sent messages of support.

The address hasn’t changed: buzz@nww.com.

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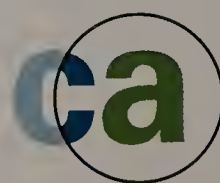
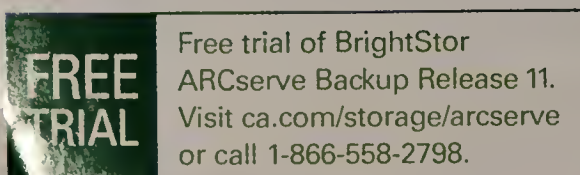
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